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The Youngstown Sheet & Tube Company

The Open-Hearth Plant, Blooming Mill and Other Details of the Important Extensions Now About Finished

The Youngstown Sheet & Tube Company, Youngstown, Pa., one of the largest independent steel concerns in the country, has about completed some important additions to its works at East Youngstown which will very largely increase its capacity, particularly in pig iron and open-hearth steel. The growth of this concern since its incep-

trated at length in *The Iron Age*, August 2, 1906. From 1906 to 1911 some extensive additions were made, these including three 500-ton blast furnaces, a mixer and pig casting plant, six tube mills, ten double puddling furnaces, eight more sheet mills, including three galvanizing kettles and a turbo-generator plant. When these additions were

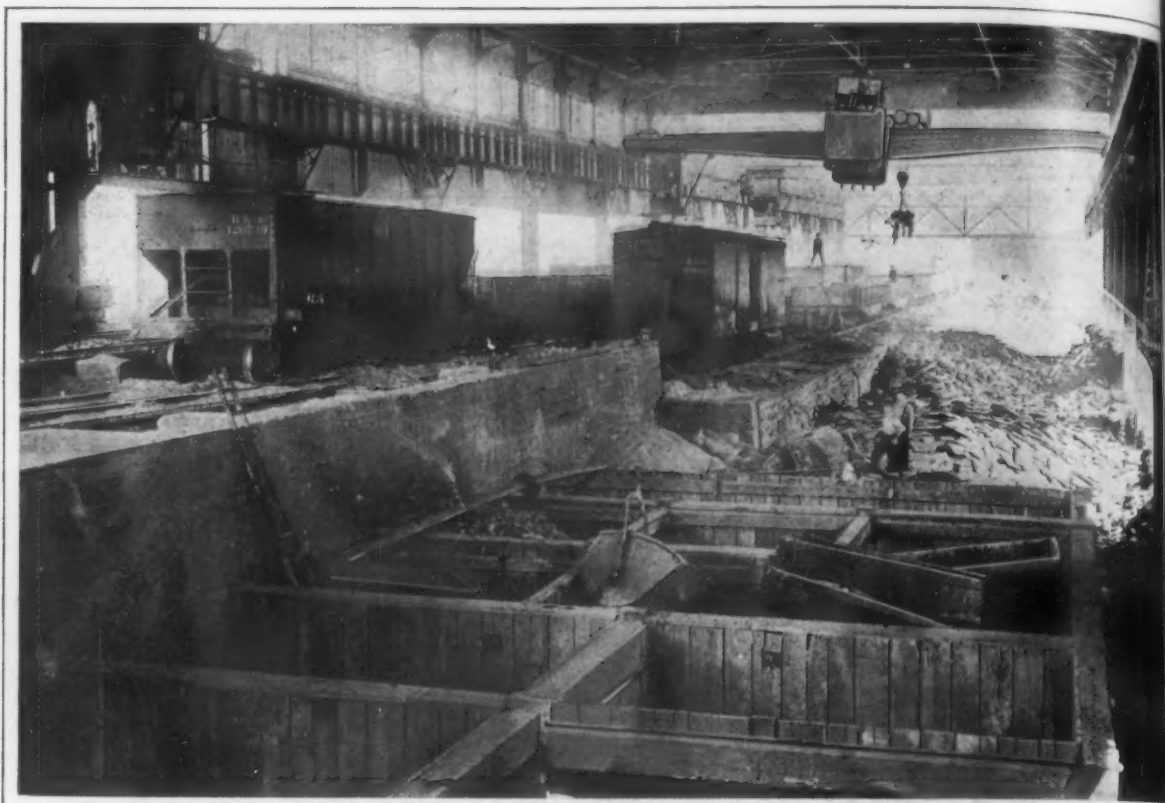


Tapping and Pouring Side of the Open-Hearth Steel Plant of the Youngstown Sheet & Tube Company

in 1901 has been remarkable. The initial plant contained 15 double puddling furnaces, a muck bar mill, a strip mill equipped to roll up to 22½ in. in width, three tube mills and six sheet mills, the product of the concern at that time consisting of black and galvanized sheets and pipe up to 8 in. in diameter. From 1904 to 1906, extensive improvements and additions were made to the plant, including a Bessemer steel plant was added with a capacity of 2000 tons or more a day, and also a 40-in. blooming mill and some additional finishing mills, illus-

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In 1911, the company purchased the plant of the Morgan Spring Company at Struthers, Ohio, containing a site of 90 acres on which had been erected a rod mill, con-



Stock Yard and House for the Raw Materials for the Furnaces, with Space for 30,000 Tons of Pig Iron, Reinforced Concrete Bins for Limestone, Iron Ore, Etc., and Wooden Bins for Chrome Ore, Magnesite, Ferromanganese, Etc.

taining a Morgan continuous heating furnace and 16-stand double-strand Morgan continuous mill housed in a building 55 x 350 ft. There was a wire nail factory, 85 x 396 ft., containing 89 nail machines and there was also complete equipment for the manufacture of all kinds of wire fencing. Very shortly after acquiring this plant, the Youngstown Sheet & Tube Company practically doubled its capacity in every department, and to-day it makes wire nails and all kinds of wire and field fencing. The extensions and additions made to the plant from 1906 to 1911 were described in *The Iron Age*, Sep-

tember 21, 1911. There was also printed in that issue a general map, showing the completed plant as it existed at that time and also the provisions for 14 open-hearth furnaces eventually and for a fourth blast furnace. In the interval between 1911 and 1913, the company made still further additions to its plant, including the fourth blast furnace, with a capacity of 500 tons a day, which the company expects to blow in about August 15, and an open-hearth steel plant and a 44-in. blooming mill complete with pit furnaces, stripper building, etc. It is to this steel plant and blooming mill that the present article is devoted.



Stripper Building, Containing Two Strippers for Single Ingots and a Third Stripping Two Ingots in One Operation

The open-hearth department comprises six of the 14 furnaces of a capacity of 100 tons per heat, giving a rated output of 30,000 tons of open-hearth ingots per month. Provision has been made in the erection of the buildings and general layout for the eight remaining furnaces and a hot metal mixer. The open-hearth furnace building is 145 ft. wide by 552 ft. 6 in. long, with a clear height from yard level to the bottom chord of roof trusses of 66 ft., and with a lean-to 35 ft. 6 in. wide, extending the entire length on the south side, containing one narrow gauge track as well as a three-rail track. The pit on the pouring side of the furnaces is 60 ft. wide, while the remaining 85 ft. of width is occupied by the charging floor, the top of which is 19 ft. above yard level.

The charging of the furnaces is done by two floor-type charging machines, with a span of 24 ft. 6 in., built by the Morgan Engineering Company, and the charging floor is spanned by a 100-ton Morgan ladle crane having an auxiliary hoist of 25 tons capacity. Two 165-ton Morgan ladle cranes, each having a 30-ton auxiliary hoist, are provided for handling the 100-ton steel ladles on the pouring side, with one 6-ton jib crane, made by the Whiting Foundry Equipment Company, attached to the building columns at each furnace for handling the pouring spout. Over both the charging floor crane and pit cranes, for repair purposes, is a 7½-ton mono-rail trolley looped at the ends. Each furnace has a hearth 16 x 40 ft. and is bound with cast-steel water-cooled bucketstays. Two of the furnaces are equipped with the Knox return-circulating water cooling system. Two are provided with water-cooled Blair ports and the other four are cooled in the usual manner.

The raw materials for charging the furnaces are brought from the stock yard, located west of the furnace building. Two 50-ton narrow-gauge Baldwin locomotives are employed for this and for the ingot run, and the material is delivered to a 150-ton narrow-gauge Fairbanks track scale. The stock yard, including storage bins and crushing machinery, is contained in a building 93 ft. 8 in. wide and 600 ft. long, 320 ft. of which is under cover, while the remaining 280 ft. is used for pig iron and scrap storage. Provision has been made at the extreme west end for an extension of 200 ft. The building is served by two 10-ton Alliance cranes, one crane with a 10-ton bucket hoist for handling a 50 cu. ft. Hulett grab bucket. The stock yard is equipped with a number of electric lifting magnets installed by the Electric Controller & Mfg. Company.

There is ample storage space provided in the open run-way for 30,000 tons of pig iron, while the reinforced concrete storage bins are capable of holding an eight-day supply of limestone, as well as enough iron ore for 16 days and dolomite for 11 days. In addition to the concrete bins, a series of wooden bins has been erected, designed for chrome ore, gannister, magnesite, ferromanganese and burnt dolomite. The crushing and grinding of the gannister and chrome ore is done by a 7-ft. wet grinding pan and a 12 x 20 in. Blake type crusher, each motor driven and furnished by the Thos. Carlin's Sons Company.

The cinder yard, paralleling the stock yard on the north,

is built with an extension of 230 ft. in view and is 81 ft. 8 in. wide and 320 ft. long. The crane service consists of two Alliance cranes of 10 and 25 tons respectively. The 25-ton crane has a 10-ton auxiliary hoist located in the trolley with the main hoist, and a 15-ton bucket hoist in a separate trolley, suitable for handling a 67 cu. ft. Hulett grab bucket.

The gas producer plant consists of 18 Hughes mechanical producers arranged in batteries of six, three to each furnace. Six bell-bottom steel stacks, each 7 ft. 9 in. in diameter and 160 ft. high, furnished and erected by the Wm. B. Pollock Company, are located on the south side of the furnace buildings and connected to the overhead gas main by a burn-out connection. McKennan valves are used on both the gas inlets 42 in. in diameter as well as on the air inlets at the furnaces, 54 in. in diameter.

The coal and ash handling system for the gas producers designed by the C. O. Bartlett & Snow Company, is located at the west end of the producer buildings. Coal is run

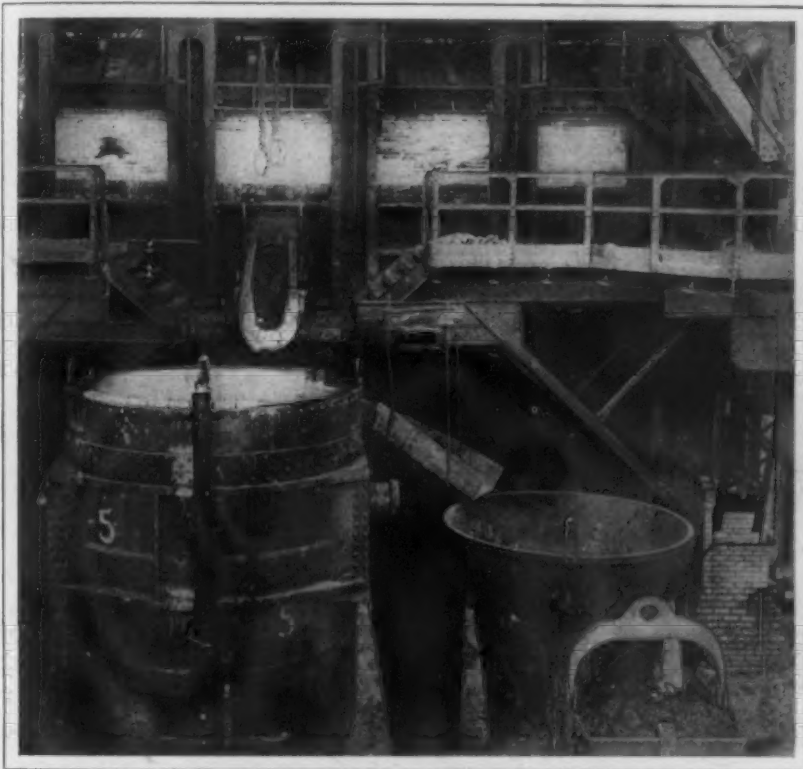
from standard-gauge gondola cars into track hoppers, the top of hoppers being located at yard level. From the track hoppers the coal is conveyed to a crusher which delivers into a hopper supplying by means of two skip buckets a 500-ton storage bin. From this bin the crushed coal is drawn into a 10-ton electric larry scale car, made by the Atlas Car Mfg. Company, and delivered to the individual hoppers over the producers, each hopper having a capacity of 35 tons. Ashes are ejected into a side-dump ash car and delivered to ash hoist buckets which empty

into a standard gauge car for removal as needed.

Open-hearth ingots from the east end of the open-hearth furnace building, as well as Bessemer ingots coming from the converting mill, are brought to the stripper building. The stripper building is of steel frame construction with corrugated iron sheeting, 84 ft. x 154 ft. in plan, equipped with three strippers, made by the Morgan Engineering Company. Two are for stripping single ingots, while the third is arranged to strip two ingots at one operation. At the west end of the stripper building the stripped ingots are weighed on two 150-ton narrow-gauge Fairbanks track scales, with track system arranged from this point so that ingots may be taken to either the old No. 1 pit furnace building or to the new No. 2 furnace building.

The No. 2 pit furnace building is built with a 26-ft. lean-to on the south side, over the valve platform, and is 84 x 308 ft., housing five pit furnaces with unused space in the east end for a future sixth furnace. These furnaces are all of the four-hole regenerative type, each hole having a capacity of six ingots and equipped with Treat hydraulically operated covers, the top of cover located 6 ft. above yard level. All furnaces have three gas inlets, each controlled by a 36-in. McKennan gas valve, and the ingots are charged and withdrawn from the furnaces by means of two 7½-ton Morgan charging cranes, each crane having a 5-ton auxiliary hoist for handling coke buckets, etc.

The gas producer plant supplying the fuel for the pit furnaces is located north of No. 1 pit furnace building, and has been extended on the east end to provide for the

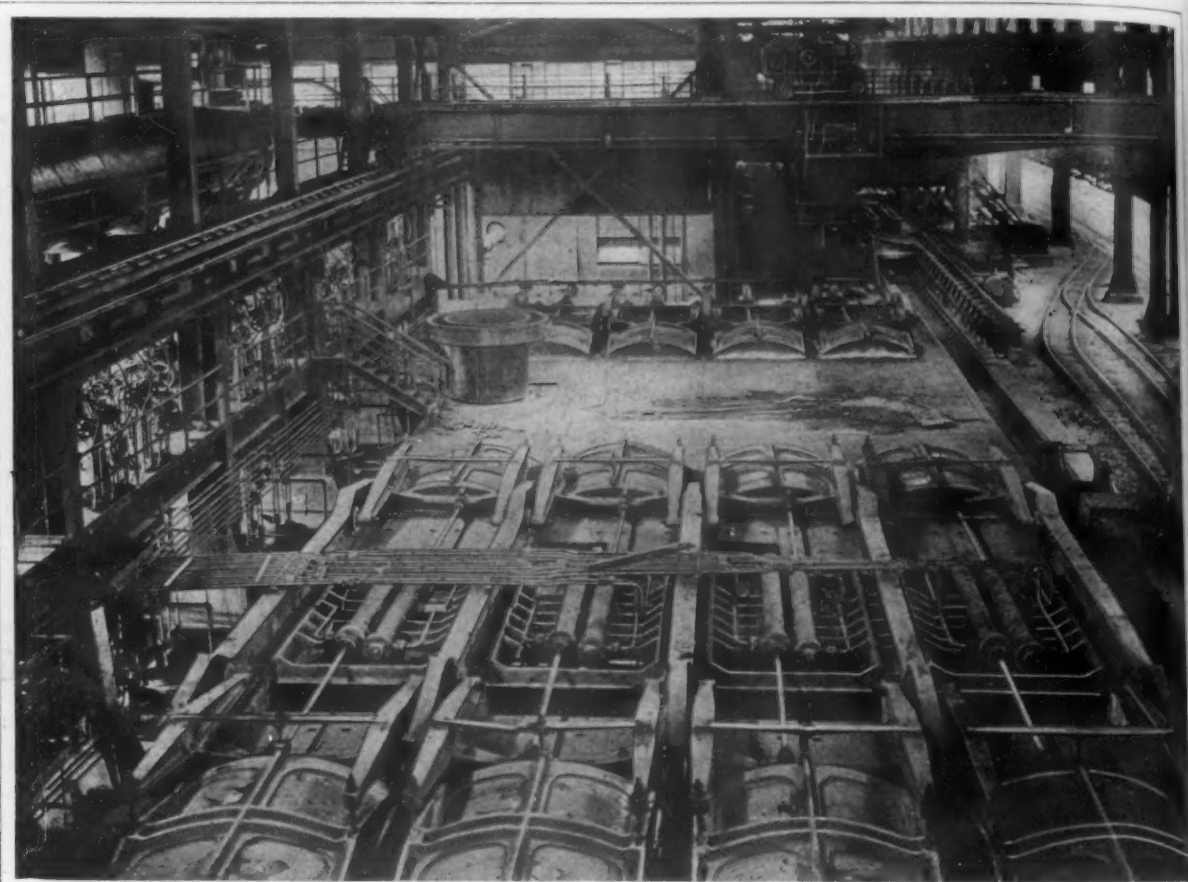


A 100-Ton Steel Ladle, with the Slag Ladle Alongside

new pit furnaces. A departure has been made in this extension from the type of producers previously installed, which installation consisted of ten 12-ft. double-hopper producers. To this battery have been added four 10-ft. Morgan mechanical producers, and the complete layout has been re-arranged so that eight of the original producers are used for the furnaces in No. 1 pit furnace building. The two remaining producers have been coupled up with the four Morgan producers, making a battery of six producers for the new pit furnaces, which, it is intended, will furnish sufficient fuel to take care of the future sixth pit furnace. Each producer is connected by means of an uptake to an 8-ft. gas main header, from which an overhead gas main, 7 ft. 6 in. in diameter, leads to the east end and along the south side of the pit furnace building, where each furnace is connected by a 3-ft. 10-in. downtake. The

Kennedy design and contain two double helical pinions of 44 in. pitch diameter, and 50-in. face. These pinions are planed accurately in a special machine of the Tod Company and operate smoothly it is said with less than 1-64 in. back lash. The driving spindle connecting the bottom pinion to the engine is a flexible coupling of the Kennedy type.

The front and rear tables are each 50 ft. long and consist of steel cast rollers 18 in. in diameter and 11 ft. 9 in. center to center of bearings. Both tables are stationary, and each table is driven by two 100-hp. Westinghouse motors connected with flexible couplings. The table girders are heavy steel castings of I-beam construction. The first four rollers of the front table where the ingot is dumped have forged steel shafts and the feed roll is a steel casting carried loose on a forged steel shaft which is driven. The shaft is carried on steel cast brackets, brass



The New Pit Furnaces, Showing the Ingot Buggy at the Right and Also the Extension Approach Table to the Blooming Mill Immediately Beyond

gas mains and piping equipment were furnished by the Variety Iron Works Company, Cleveland, Ohio.

The new No. 2 blooming mill adjoining the No. 2 pit furnace building on the west is 52 ft. 6 in. wide and 420 ft. long. A 30-ton Alliance crane, having a 15-ton auxiliary hoist, is installed for convenience in handling machinery and repair work. Leading from the pit furnace building and on the north side of the ingot run is a narrow extension table, which is used only in the case of an accident to the ingot run or buggy, and in this event the ingots can be taken from any furnace by the charging cranes and placed on this extension table connecting with the front mill table.

The blooming mill is a 44-in. mill and is arranged for rolling and edging a billet 42 in. wide. The lift of the top roll is 43 in. The length of the rolls between bearings is 99 in. The mill housings are steel castings weighing 110,000 lb. each. The screw down is of special design driven by two motors, either of sufficient capacity to operate both screws in case of necessity and arranged to operate in series and parallel in ordinary service. The screws and driving mechanism are completely enclosed but readily accessible for repairs or renewals. The top roll is counterbalanced by a hydraulic cylinder, as is also the vibrating spindle. The vibrating spindle is a steel forging of Kennedy design. The pinion housings are also of

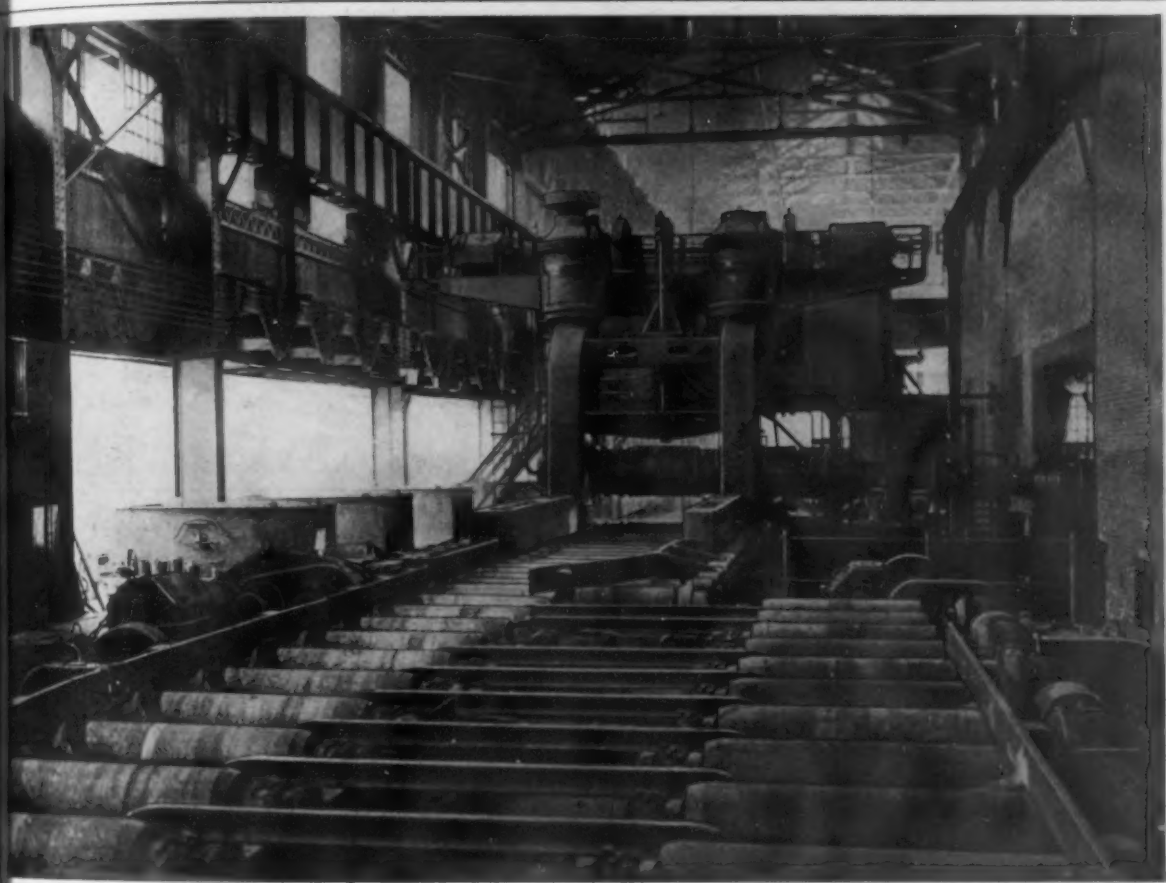
lined and is easily removable from the feed roll. The driving gears of the tables are completely enclosed with semi-steel gear guards forming complete protection for the workmen and also for the gears. The manipulator is of the Kennedy-Wellman type, and provision is made for handling the ingot on both the front and rear tables. It is actuated by hydraulic cylinders of steel, cast, all located on the drive side of the mill. The racks and gears are steel castings with machine-cut teeth.

The engine and hydraulic system are housed in a brick building, 57 ft. 6 in. x 180 ft., alongside the blooming mill building, and is equipped with a 75-ton Alliance crane with a 15-ton auxiliary hoist. The engine for driving the blooming mill is a 46 and 76 in. x 60 in. double tandem-compound reversing engine, designed and built by the Mesta Machine Company, Pittsburgh, and runs on a 120-in. Helander barometric condenser. The engine is built with center cranks on both sides, rather than with overhung crank. The construction is regarded valuable as affording duplicate design of two halves of the shaft so that only one-half of the shaft need be carried as a spare; duplicate design of connecting rods, and a direct straight line valve gear drive without go-around-the-corner rockers. The low-pressure valve and the high-pressure valve are connected solid without rockers and move as one piece so that the number of joints needing attention is

minimized. The handling of the engine is done entirely by one lever. The cut-off and the throttle are interconnected in such a way that, with increasing length of cut-off, the throttle opening is also increased. The arrangement, if carried out without modification, would be faulty, it is admitted, because there would be certain positions from which the engine could only be started with a sudden jerk. In order to insure smooth starting and easy handling in any position and with any load, auxiliary ports have been provided of such a size and such a location that they admit sufficient steam for starting from any position, and yet do not noticeably affect the steam economy under running conditions. The moving parts of the engine are covered with heavy shields of boiler plate, and gangways and runways have been provided for the operator. In order to make this thorough covering possible, it was necessary to

mill. A crop conveyor of the chain type, designed and built by the William Tod Company, extends under both shears, conveying the crop ends outside of the mill building proper, and delivering them into special type narrow-gauge cars.

A material increase in the pumping capacity became necessary with the installation of the open-hearth plant and the No. 2 blooming mill, and to this end a new pumping station was erected, with the necessary cast-iron pipe lines to condensers, etc. The station is located below the charging floor level and midway between the furnace building and stock-handling building. The structure is of brick and steel construction above yard level, while the complete substructure, consisting of pump house, with forebay and river intake connected by an aqueduct, is of concrete. The pump house proper is 27 ft. 6 in. x 72 ft. 6 in. The floor line is 15 ft. below yard level, and is

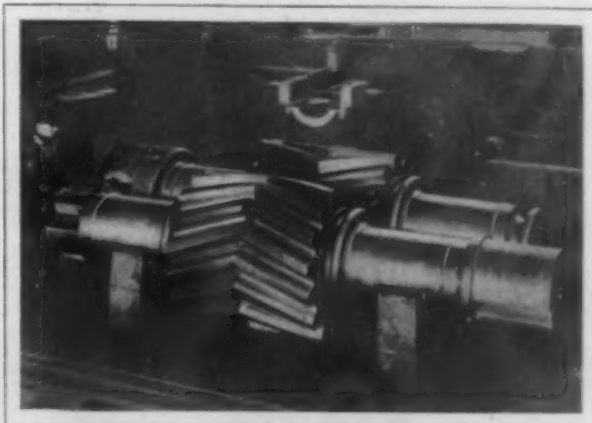


Blooming Mill Viewed from the Delivery Side, Showing the Roll Spindles Extending from the Pinion Housing in the Engine Room at the Right

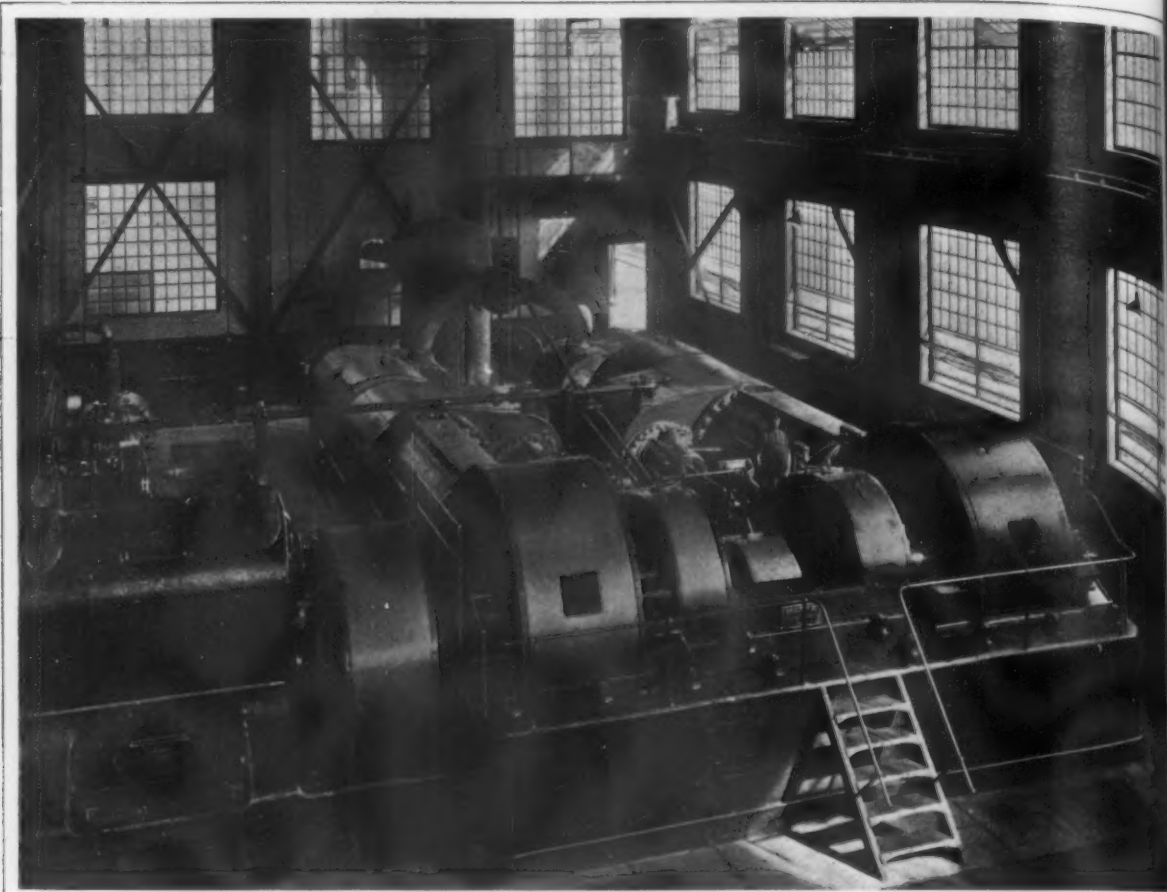
provide an oiling system which would be automatic and efficient in its action.

In connection with the hydraulic system, two 28 x 52 x 16-in. cross-compound pumps were installed by the William Tod Company and a 36-in. accumulator by the Cleveland Machine Company. From the end of the rear mill table, the blooms are run on a table to a hydraulic shear with a capacity for cutting 10 x 10-in. blooms, or they can be transferred to a table conveying the bloom direct to a steam hydraulic shear, with a capacity for cutting 10 x 20-in. blooms, suitable for shearing a 20 x 20-in. billet, or slabs up to 42 x 8 in. These shears were designed and built by the United Engineering & Foundry Company, Pittsburgh, while the tables and transfer were designed by the Youngstown Sheet & Tube Company and built by the Cleveland Machine Company. Slabs from the large shear are passed over a depressing table direct to the hydraulic slab piler. The slab yard in which the slab piler is located is 106½ x 220 ft. with a crane runway 100 ft. 10 in. center to center of rails, spanned by a 10-ton Alliance crane. Billets or bars from the hydraulic cropping shear are carried on the shear run-out table over transfer to the billet mill approach table, provision having been made on this table for turning the billets in any position desired. This table connects with either the 18-in. continuous billet mill or the 18-in. continuous sheet bar

equipped with two 20,000,000-gal. Wilson-Snyder motor-driven direct-connected horizontal centrifugal pumps for condenser water service and one 20,000,000-gal. Wilson-Snyder centrifugal pump for the 50-lb. pressure water sys-



The Two Helical Pinions for the Blooming Mill Drive, Youngstown Sheet & Tube Company, Each 44 In. Pitch Diameter and 50 In. Width of Face, Made of Nickel Steel

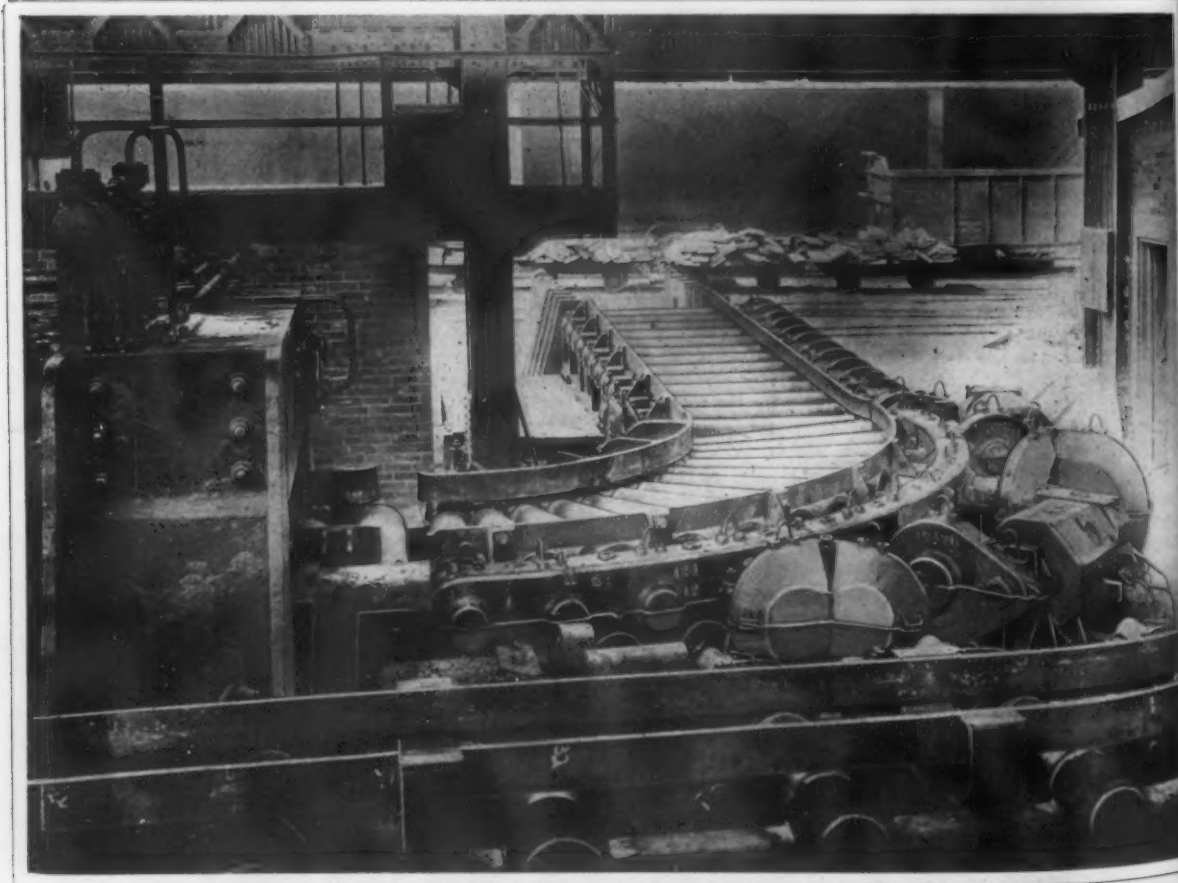


The Double Tandem Compound Blooming Mill Engine, with 46 and 76 In. Cylinders of 60 In. Stroke, Built by the Mesta Machine Company

tem, while space is provided for a fourth pump of the same capacity. A Northern 10-ton handpower crane is installed.

At present only four of the new six open-hearth furnaces are in operation, and already some splendid records

for output have been made. The Youngstown Sheet & Tube Company now has a capacity for turning out 2500 tons of Bessemer ingots and 1000 to 1200 tons of open-hearth steel ingots per day, or a total annual capacity of



Circular Runout Table from the Shear Beyond the Blooming Mill, Delivering Slabs or Billets to the Yard

about 1,100,000 gross tons of Bessemer and open-hearth ingots. Most of this steel is used in its own finishing mills, but a part of it is sold in the open market in the shape of Bessemer or open-hearth billets and sheet bars. As stated before, blast furnace "D" is nearly completed, and is expected to be in blast about August 15, which will give the company an output of upward of 2000 tons of pig iron per day, all of which it will use in its Bessemer and open-hearth steel works. It also takes the entire output of pig iron this year from the Mary furnace of the Ohio Iron & Steel Company at Lowellville, Ohio, and in addition is a frequent buyer of pig iron in the open market. The company contemplates some time in the future building a fifth blast furnace, and also by-product coke ovens of sufficient number to make its entire supply of coke.

A New Railroad Steel Tie

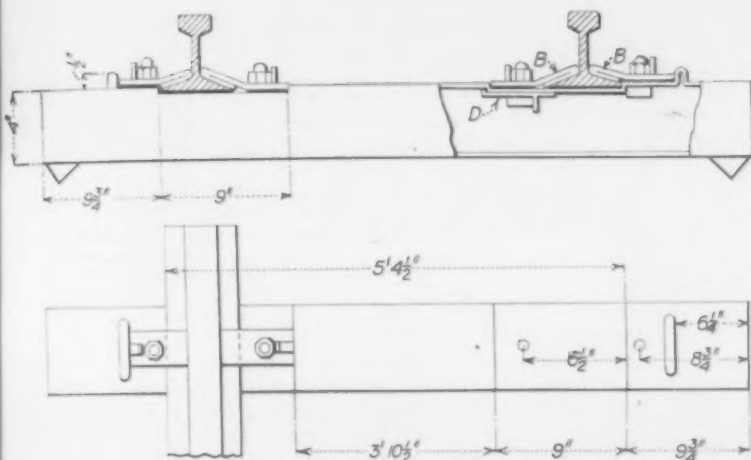
A new steel railroad cross-tie formed of steel plate has been invented by Frank McCune, general manager of the Monongahela Connecting Railroad, Pittsburgh, and a United States patent was granted to him on July 8. Its main features are indicated in the accompanying illustration. The plate is bent into a box form of cross-section; the top of the tie has two depressions, one toward each end to receive the rail base; there are special clamps to fasten the rails to the tie; lugs are provided on the fasten-

Both the clamp for the rails and the clamp or washer fitted underneath the tie have clips which are formed by slitting the metal plate of the clamp, forming a tongue. This tongue, after the bolt is drawn tight, is bent upward to lock the nut, as the drawing indicates. As stated, considerable emphasis is placed on the value of the projection formed by bending the ends of the lower part of the box construction to prevent endwise movement of the ties on the roadbed.

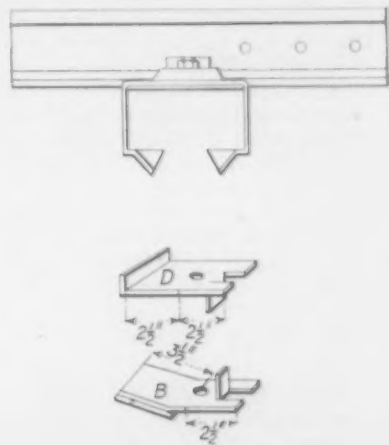
The McCune tie, made of 5-16 in. steel plate, weighs 190 lb., about 10 lb. less than the average weight of the standard oak cross-tie, so that the tie is one which should be easy to handle without increased labor cost over the use of wood ties. It is understood that these ties are to be laid out for use by the Monongahela Connecting Railroad. It should be added that the present tie is a decided development of one Mr. McCune brought out some years ago, as illustrated in *The Iron Age* September 28, 1905.

Prices of Black and Galvanized Sheets

The American Metal Market says: In general the market swings have indicated that \$1 per ton change in the spread between black and galvanized sheets corresponds to a change of 40c. per 100 lb. change in the price of spelter. We are now advised of a symposium of views obtained from different galvanizers which coincides quite well with this rule, the average of these views being that



Details of the McCune Steel Railroad Cross-tie



ings of the clamps to prevent turning of the nuts on the track bolts; the location of the depressions in the top of the tie, together with the lug formed toward the end of each tie (by striking up or folding the top surface of the tie), are such that the rail cannot move either outward, producing track spreading, nor move inward, producing what is known as track creeping, and the outer four corners of the bottom of the tie are bent downward to form anchors to keep the track in alignment on the roadbed. The box shape construction is counted on particularly to give the desired resilience. While it is admitted that the cost per mile of track with the McCune steel tie would be approximately \$2000 more than with the usual form of tie, the life of the tie is regarded as three times that of a wooden tie, and in addition it has a scrap value when it is no longer of use in carrying the rails.

The illustrations show a longitudinal side elevation of the tie, partly in section, a plan of the tie showing how the rail is fastened in place and an elevation of the tie, together with two details, one of the two rail clamps used at each end of the tie and the other the washer or clamp fixed underneath the tie toward each end, as indicated in the side sectional elevation. It is clear that the location of the depression in the top of the tie is such that the gauge of the railroad track is established, and the provision for preventing the rail moving outward along the tie is shown by the use of the lug formed in the top surface of the tie, against which lug the end of the outer rail clamp fits. In a similar way the creeping inward of the rail is prevented by the rail clamp's fitting against the shoulder of the depression in the top surface of the tie.

a change of one cent per pound in spelter changes the cost of making No. 26 gauge galvanized sheets \$2.50 per ton. This is the same thing as \$1 per ton on galvanized sheets and 40c. per 100 lb. on spelter. There is a divergence, however, with respect to gauge, as a change in the price of spelter affects the lighter gauges more than the heavier. Some producers, making a specialty of heavy gauge galvanized sheets, have an average gauge of somewhat below No. 26, though not as low as No. 25. Others, in the majority, have an average considerably higher, and close to No. 27 gauge. Thus it appears to be a conservative statement that the cost of galvanizing is increased \$1 per ton for 40c. per 100 lb. advance in spelter, or \$2.50 per ton on an advance of one cent a pound in spelter. Then the advance of half a cent in spelter should by rights increase the spread by \$1.25 a ton, or 6 1/4c. per 100 lb., and if the spread was \$1.05 on spelter a trifle under five cents, based on black at 2.25c. and galvanized at 3.30c. then with black at 2.25c. now, and spelter at close to 5 1/2c., galvanized sheets should be above 3.35c. The fact remains that they are not.

A Congressional appropriation has made possible the testing of large scales by the Bureau of Standards at Washington for the benefit of manufacturers and others. The equipment will include eight 10,000-lb. weights, four 2500-lb. weights, with numerous smaller ones, totaling more than 100,000 lb. A motor truck will be provided for hauling the weights, a crane for handling them, a gasoline engine for power supply, etc. A car will house and transport the equipment.

Basic Pigments and Metal Corrosion

Basicity Increases Rust-Resisting Properties—"The Purer the Paint the Poorer"—Painting on Mill Scale

The powerful influence of basic pigments in protecting metals from corrosion is discussed by Henry A. Gardner, assistant director Institute of Industrial Research, Washington, D. C., in the Engineering Record of July 26, 1913. The author has called attention previously to the remarkable rust-preventing properties of litharge (lead monoxide) which has been found to give even more pronounced inhibitive results than the chromate pigments when placed in water in contact with iron plates. This was explained by the highly basic nature of the pigment. But litharge as a pigment mixed with linseed oil is impracticable on account of the rapid hardening of the mass due to chemical reactions. Mr. Gardner says in the article cited above:

It is of interest to record that paint pigments are now available which contain a very high percentage of litharge in such physical condition as to be practically free from action upon linseed oil and yet possessed of the normal inhibitive character to be expected of the litharge content. The pigments referred to are those which are produced by the sublimation of lead and zinc ores, among which may be mentioned basic sulphate-white lead and sublimed-blue lead. The latter material consists approximately of 65 parts of lead sulphate and 35 parts of lead oxide, the components being chemically and physically combined in the form of an amorphous pigment substance of great fineness. The presence of small percentages of carbon and lead sulphide as natural impurities gives to this pigment a pleasing steel-gray color. Although the high percentage of litharge in this product, if uncombined, would be sufficient to cause the immediate hardening of a linseed-oil paint made therefrom, experiments have shown that this pigment is practically free from reaction with saponifiable oils. That this pigment is highly inhibitive and most durable when mixed with linseed oil and spread upon iron plates has been demonstrated in exposure tests placed by the writer at Atlantic City five years ago under the supervision of the American Society for Testing Materials.

Factor Affecting Inhibitive Value

The degree of basicity of any pigment is to a large extent responsible for its good behavior when applied as an oil paint to a metal surface. Normal or neutral lead chromate gave only fair service. On the other hand, basic chromate of lead, a lead-chromate pigment containing a considerable percentage of litharge in chemical combination with normal lead chromate, was found to be the most highly inhibitive protective paint in the tests. After five years' exposure its rating is still practically 100 per cent., as recorded by the official inspectors.

A chromate pigment, to be inhibitive, must be either slightly water soluble or basic. Zinc chromate is a good example of a slightly water-soluble chromate pigment. In the presence of water it is subject to ionization, thus rendering available its chromic acid content, which has the effect of preventing the solution pressure of iron. Basic chromate of lead is a good example of a chromate pigment which is highly inhibitive on account of its basic nature. On account of the insoluble and neutral nature of normal lead chromate this material would not be expected to fulfil the requirements of an inhibitive chromate pigment.

Zinc oxide is another basic pigment which has proved highly valuable as a constituent of metallic paint. In physical combination with lead sulphate (in about equal parts), as it occurs in zinc lead, this pigment has shown the pronounced inhibitive effects of pigment basicity. Zinc oxide fortunately is a pigment which of itself may be ground in linseed oil, of normal acid value, and shows little tendency toward hardening. In this form, therefore, it is coming into use as an inhibitive base pigment to admix with iron-oxide roofing paints, to which it adds considerable merit.

Value of "Pure" Paint

In an article entitled "Paint Efficiency and Paint Purity," which appeared in *The Iron Age* for February

13, 1913, George Auchy states that the paint trade is discovering that "the purer the paint the poorer." Assuming that the word "pure" may be applied to such a substance as paint, there can be no question that Mr. Auchy's theory holds good in many instances. That the purity of a truly stimulative pigment has much to do with its rust-producing properties there is much evidence to show. Pure graphite, pure carbon black and pure lampblack, ground in oil and applied to steel plates in the Atlantic City tests, developed their rust-exciting tendencies in a very short time. Tests simultaneously made, with the same pigments admixed with large percentages of neutral inert pigments such as barium sulphate and silica, prove the value of these so-called paint extenders in nullifying the corrosive action of the black-carbon pigments and in strengthening their films.

That the theory "the purer the paint the poorer" would not always apply where a really inhibitive paint is concerned is the writer's belief. Paints made entirely of basic chromate of lead, pure sublimed blue lead or pure zinc chromate, ground in the proper amount of linseed oil, will outlast paints made of only a small percentage of the same pigments admixed with a large percentage of barium sulphate or china clay. However, there may be a critical point in the admixture of the inhibitive pigments with the inert pigments where added percentages of the inhibitive pigments cease to add proportionately to the value of the mixture. This point, however, has not been determined by practical tests with all of the pigments, although considerable laboratory investigations on the subject have been made.

Basicity in the Light of Results of Tests

Further proof of the effect of basicity upon the rust-preventing properties of pigments is shown by the condition of two grades of red lead at the end of a five years' test, one of which has been given the trade name of orange mineral. The latter type of red lead is produced by the oxidation of off-color white lead or white-lead tailings. In its highly oxidized condition it is practically 100 per cent. red lead (tetroxide of lead), with no appreciable percentage of litharge. The condition of the paint made from this pigment is far from satisfactory. The other type of red lead contains an appreciable percentage of litharge and produces much better results, which would be still better if the red lead contained a larger percentage of litharge. The manufacturer of red lead, however, has been striving to produce a product which will answer specifications which are often ill advised, the purchaser having the misconception that the purest red lead—one containing the highest percentage of lead tetroxide—would be the best.

In the endeavor to meet such specifications some manufacturers have made use of artificial oxidizing agents, such as potassium nitrate, in conjunction with the furnacing of the pigment. The red lead resulting from such treatment, although containing often as high as 98 per cent. lead tetroxide, is liable to contain a small percentage (0.1 to 0.5 per cent.) of soda or nitrate salts. These may be extremely active in promoting rust.

A Proposed Specification

The question that now remains for decision is: Of what should a red lead consist in order to be thoroughly inhibitive? In the writer's opinion red lead answering the following specifications would be highly inhibitive and more acceptable than any other for general painting purposes:

Red lead (tetroxide of lead, Pb_3O_4)..... 82 to 88 per cent.
Litharge (monoxide of lead, PbO)..... 18 to 12 per cent.
Less than 0.5 per cent. total impurities such as copper, silica, iron, etc. Must be free from nitrate salts.
The red lead should be bright in color and of such fineness that 99.5 per cent. should pass through a 200-mesh screen.

Such a red lead would be more generally available than one containing the higher percentage of lead tetroxide, the drying power would be excellent, and if mixed with linseed oil just before application would prove a highly satisfactory paint. It is well to record at this point that those red leads which consist almost wholly of lead tetroxide are not good drying pigments. It is even necessary to add artificial driers to linseed-oil paints made from such pigments. Such paints, however, have the advantage of remaining soft even after standing in sealed packages for several months. This property of the high-percentage red leads has made them popular in the manufacture of ready-mixed pure red-lead paints. The service to be expected from such paints, however, would not be as great as the service attending the use of a prepared red-lead paint made from red lead containing litharge in considerable proportion, such, for instance, as that shown in the above specifications, mixed with equal parts by weight of an inert pigment such as silica, china clay or asbestine. Paints made from such a mixture would be practically free from hardening in a package for a considerable period of time. They would, moreover, be less expensive than 100 per cent. pure red-lead paints. In inhibitive power, spreading capacity, and brushing properties they would be superior to paints made from 100 per cent. pure red lead.

Effect of Carbon Paints

Carbon black and lampblack are very popular for use as surfacers for red-lead paints, and for such use they give excellent results. In this connection it might be well to state that excellent results may be expected from most pigments which are basic in nature, if they are applied properly to a metal plate and then surfaced with a paint containing a carbon pigment, such as lampblack, carbon black or graphite. There are included in the Atlantic City tests several panels which were originally painted with three coats of ordinary whiting (calcium carbonate) ground in linseed oil. On the lower left-hand corner of these panels were placed numbers with lampblack paint. The basic nature of the calcium-carbonate pigment protected the metal from corrosion for a considerable period of time. The great chalking tendency, however, of the whiting caused the removal of the paint within eighteen months, except in those spots which had been coated with lampblack numbers. In such places perfect condition of the paint film is shown. This result further strengthens the writer's good opinion of basic pigments as primers of metal.

Action of Mill Scale

The question as to whether painting done over metals surfaced with mill scale would be as efficient as painting done over metals previously cleaned from mill scale through the use of the sandblast or by pickling has been discussed at length by various authorities. In some instances, such as in the case of a large steel bridge structure, the cleaning of the metal before painting is often impracticable. Excellent results have been recorded of painting done on such types of work, directly over the mill scale. For smaller work, however, wherever the removal of the mill scale is practicable, the expense of cleaning will be justified by the good results obtained.

A pinhole in a sheet of tin plate may lead to the destruction of the plate. A pinhole in a paint film or a defect in the metal surface may lead to serious results if the pigment is not inhibitive. The admission of moisture through an abrasion in the film may cause the formation of a cup which will collect and retain sufficient water to start the active formation of rust. The increasing amount of rust expands the size of the film cup, gradually filling it with a soft, porous, water-retaining mass of iron-oxide pigment. If the pigments in a paint film are thoroughly inhibitive, pinholes or scratches do not constitute a serious menace. The moisture which deposits upon the abraded surface has little or no effect when in the presence of a thoroughly inhibitive pigment. This condition, however, might not hold true in certain cases. Some sheets of black metal have upon their surface a type of mill scale which is evidently not of a continuous nature. The electro-negative nature of the mill scale would tend to force into solution any exposed area of iron. Development of gaseous hydrogen beneath the paint film at such spots would account for the formation of blisters.

Other Paint Materials

By-product tars from coke ovens, gasworks and other sources have formed the base of a great many paints sold for the protection of metal. These paints make very good coverings for metal exposed to acid fumes within buildings, but do not have the property of withstanding exterior exposure. The action of the sun is most powerful in breaking them up.

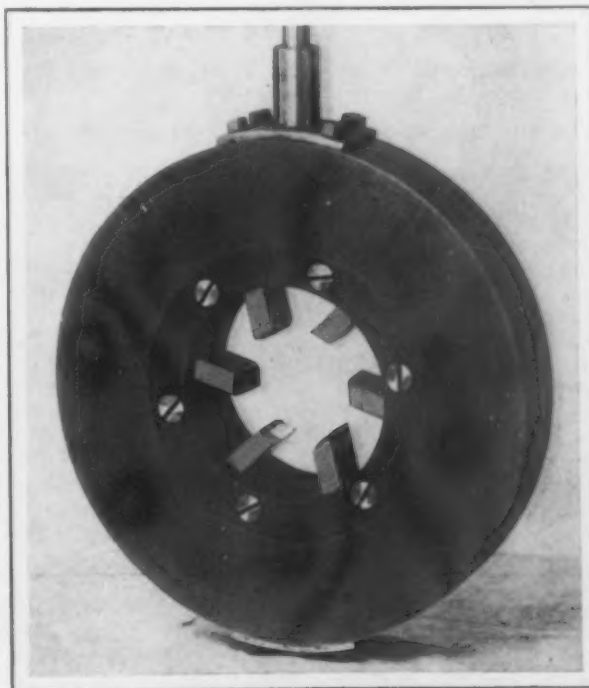
It has been thought that greater durability might be expected of a paint if its linseed oil content were replaced with varnish containing costly resins such as kauri and copal. As a matter of actual test, however, varnish paints for metal have never proved very satisfactory. The crazing of the varnish is responsible for the early decay of such paints.

Iron oxide might also be classed as a basic pigment. If of good quality, it gives very fair results on metal surfaces. When admixed with calcium sulphate in the form of venetian red, it is less satisfactory than when used in its purer state. Black precipitated oxide of iron is, on account of its highly basic nature, a pigment of great value in the manufacture of metal paints. Black paints made with this pigment have outlasted all the other black paints exposed at Atlantic City. Its use should rapidly increase, now that its merit is established. In fineness and hiding power it is superior to all other forms of iron oxide.

An Expanding Die for Threading Steel Pipe

For use on power pipe-threading machines, the Pipe Machinery Company, Cleveland, Ohio, has developed a new pipe-threading die, which it is claimed will thread open-hearth steel, Bessemer steel or wrought-iron pipe with equally good results. Among the advantages claimed for the die is the use of a greater number of chasers than is ordinarily employed.

The die is of the expanding type, the chasers being opened and closed by a right and left hand spiral thread movement. The use of a large number of chasers, it is pointed out, divides the work to be done into smaller units without decreasing the production of the machine



A New Expanding Type of Die for Threading Open-Hearth or Bessemer Steel or Wrought-Iron Pipe

or increasing the labor required of the operator. It also supports the pipe which is being threaded at more points on its circumference, which, it is emphasized, makes the pipe more rigid and less apt to split at the weld, and also prevents a single chaser from digging into the metal and destroying the thread which is being cut. The arrangement of the chasers is calculated to bring them at a proper angle for all sizes of pipe within the range of the die.

A Revised Pension Plan

A Funding Provision Payable on Separation from Service

An article was recently presented by Albert de Roode in the American Economic Review on the pension system for employees in industrial establishments. Growing demands on the part of employees for pensions, he says, are really demands for higher wages, using the expression wages in its broad sense, as the return which the employee gets from his labor. A pension is as much a part of an employee's real wages as are conditions of labor, guarantee of steady employment, medical attention, half-pay in case of sickness and other features not included in the actual money wages received. Theoretically the simplest way of dealing with labor would be the payment of a money wage, requiring the employee to provide for the hazards of employment and his old age. While here and there an employee does this, by and large the mass of employees do not.

In order to get a full understanding of old-age and service pensions, they should be considered as a part of the real wages of a workman. There is a tendency to speak of these pensions as being paid by the company. In a certain sense, of course, this may be correct, but it leads to confusion. A pension system considered as part of the real wages of an employee is really paid by the employee, not perhaps in money, but in the foregoing of an increase in wages which he might obtain except for the establishment of a pension system.

In most of the established private pension systems, one striking fact stands out, which is that the employee has no contractual rights in the pension fund. This absence of any contractual right is of vital importance to the employee. He foregoes an increase in his wage for the establishment of a pension. There is an absence of what in legal parlance is called "mutuality of consideration."

The average employee who would be likely to receive eventually a pension under the plans in vogue has a family dependent upon his earnings. Yet the savings from his wages which go into the pension fund are forfeited in the case of his death. In other words, the realization of his savings toward his old-age protection is forfeited unless he survives the prescribed period. This is in effect a tontine feature which, under the better insurance laws of this country, has been prohibited.

Equivalent Yearly Cost of a Pension

To illustrate by figures this situation, take the terms of the pension fund of one large company. The pension to be paid is, for each year of active service, 1 per cent. of the annual average pay during the 10 years preceding retirement, with a maximum pension of \$100 per month, and a minimum pension of \$18 per month. Employees may retire at the age of 65 if they have been 20 years or more in the service. Assume, for the purpose of this illustration, an employee entering the service of the company at the age of 25 and retiring at the age of 65 after 40 years of service, and that his average annual wage for the last 10 years was \$1200. He would be entitled to a pension of \$480 a year. The cost of an annuity of \$480 in one of the large insurance companies at the age of 65 is \$4324. To accumulate \$4324 at $3\frac{1}{2}$ per cent. interest, in 40 years, requires an annual payment of \$50.03. The value to the employee, therefore, of the provision for his old age is \$50.03 each year. In other words, to provide a fund for his own old age equal to the promised provision of the company, the employee would have to set aside \$50.03 each year. Of course, this sum would be much less, in case the employee purchased at the age of 25, paying for same annually, a deferred annuity equal to the amount of his pension with the provision that in case of his death before reaching the prescribed age all his payments should be forfeited. But, roughly speaking, this \$50.03 annually represents the value to the individual each year, in the way of an increase in wages foregone, of the promised provision for his old age.

The forfeiture from the deaths and resignations in a group of employees does not result to the benefit of the individual employee but reduces the cost of the system to the employer. Now take this employee after 20 years of service. By this service he has acquired an accumula-

tive value toward his pension of \$50.03 each year. This amounts, in 20 years, at $3\frac{1}{2}$ per cent., to \$1403, and this is the value of the wages foregone by the employee. If he leaves the service, or his employer goes out of business, he has nothing to show for these 20 years. He not only loses the accumulated value of his pension, but it is now more difficult for him to provide for himself the same old-age provision. In the remaining 20 years, to accumulate the \$4324 which will buy him the annuity of \$480, he must pay \$147.78 annually, or \$97.75 a year more than the \$50.03 which he was foregoing each year toward the company's pension.

Social Results of Usual Pension System

The development of pension plans along such lines would seem to have certain social and economic results which should be carefully considered by employees and by the public. First, it would lead to a certain stratification of the labor class. An employee who had served 20 years toward a pension is less likely to leave that class of work or to take a chance on bettering his condition, knowing that he forfeits the accrued value of the pension. Second, there is a lack of freedom in his relation with the employer. Where the granting of a pension rests entirely in the good graces of the employer, the employee is loath to jeopardize the provision for his old age by independent action. Third, there will be a natural tendency toward a lower rate of money wages or at best the maintenance of the same level of wages, without response to increased cost of living or desires on the part of the employees as a class.

At present there is no general pension system for the mass of employees in the federal, municipal and State service. Pension systems are confined largely to special classes of employees, such as teachers, policemen and firemen. They are based, in the case of teachers, on the idea that teachers are not paid very much anyway and that therefore provision should be made for their old age inasmuch as out of their meager wages they cannot be expected to provide for their old age. In the case of policemen and firemen the pensions are, to a certain extent, based on the risk of life and the hardship of the work. The risk of life, of course, so far as it enters into a pension, has really nothing to do with the old-age pensions, but is an indirect form of employers' liability. In most of the pension plans for public employees there is no contractual right except as to the obtaining of the pension upon fulfillment of the conditions. Upon death or separation from the service the employee forfeits the accrued value of his pension together with whatever contributions he may have made to the fund.

Considering Pensions as a Part of Wages

Considering pensions as a part of wages, the contributions made each year to the pension fund by the government should be considered, subject to one exception, as deferred wages, payable to the employee upon separation from the service, or to his heirs in case of death. The exception to this general principle should be in the case of the early years of service. A pension is not a mere increase in wages: it is an inducement to continued service. Many persons enter government service as a temporary occupation. The right of the employee, therefore, to the accrued value of his pension should not commence until he has passed what might be called the temporary stage. Roughly speaking, this would be five or six years, and the accrued value of the pension returned to him upon separation would commence with the beginning of what might be called the more permanent service.

There are two ideas underlying this return of the accrued value of the pension. First, the natural one following from the consideration of a pension as a form of wages, that the accrued value of the pension is actually earned by the employee and as a matter of morals should be returned to him. Second, and this is particularly important in government pensions, the natural instinct of government authorities would be not to dismiss an employee where such dismissal meant the forfeiture of a considerable money value. This is human and obtains very largely, I imagine, in private employment. It obtains to a much greater extent in public employment where there is no pocket nerve touched by the retention of the inefficient. It would make the dismissal of the inefficient government employee much easier for the removing authority

if the accrued value of the pension fund were given him on dismissal.

Considering pensions as wages, and not mere gratuities, it seems that a sound pension plan should be developed on the following principles:

(1) Pay the sums necessary to maintain the pension fund over and above the present scale of wages of its employees.

(2) Treat each employee's pension separately.

(3) Make proper funding provision upon actuarial calculation and set aside year by year the necessary sums.

(4) Give to each employee, upon separation from the service, or, in case of death, to his heirs: (a) the accrued value of his pension, or (b) the commutation of such value in the shape of a smaller annual pension, the accrued value of the pension to be determined from such point in his service as would exclude refund in the case of merely temporary service.

Characteristics of Vanadium Tool Steel

The two fractures of special vanadium tool steel shown in the illustration represent one of the important effects of the addition of vanadium to carbon steel—namely, the higher temperature to which the steel can be heated without coarsening of the grain, permitting a greater range of temperature in hardening without spoiling the tool. The upper piece is a typical fracture of Vulcan vanadium tool steel hardened at the ordinary temperature for carbon tool steel; while that below shows the fracture obtained with the same steel when hardened at a considerably higher temperature. There is a uniform and regular penetration

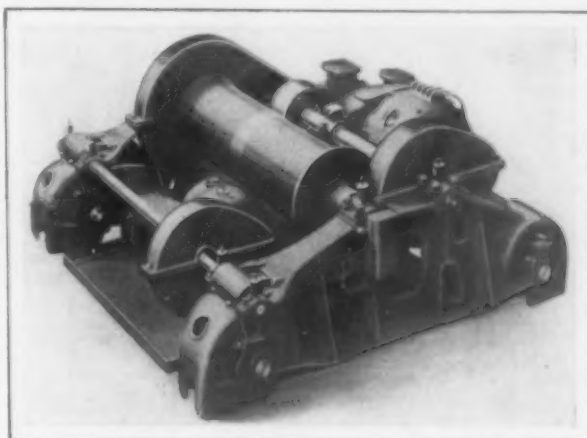
of the temper and a close, dense, fine-grained structure in each case. The higher temperature in the one case has increased the depth of the temper, while leaving the structure of the steel practically identical with that of the steel hardened at the lower temperature. Extended investigation by the Vulcan Crucible Steel Company has shown that this increase in the safe range in tempering is characteristic of this type of steel. Another feature is the tougher core due to the vanadium content. Steel makers find that when hardened to the extent shown in the upper specimen, the core of this steel can be drilled; also that there is less danger

of loss in hardening such tools, as the heavier sections of the steel can be brought up to the proper hardening temperature without injury to the lighter sections. The losses due to overheating of tool steels through the carelessness of the tool-maker are no small item. Ability to stand high heat, in the way referred to above, therefore becomes an important quality.

Heavy Oil as Engine Fuel.—The Bureau of Mines, Washington, D. C., as a result of many inquiries received on the subject, has issued a pamphlet on "Heavy Oil as Fuel for Internal-Combustion Engines." This pamphlet, which is by Irving C. Allen, presents the result of an extended search in the United States and abroad for some means of more effectively burning the heavy asphaltum oils of the Pacific and the Gulf coasts. The conclusion is drawn that the heavy oil engine cannot yet be considered fully developed, and much work remains to be done in perfecting it, but the fact that petroleum containing as high as 20 per cent. asphaltum as well as oils from tars have been successfully used is most encouraging. It is expected that the future of the engine, with also a more efficient utilization for asphaltum liquid fuels and coal and gas by-product liquid fuels, is assured.

A New Type of Steel Mill Crane Trolley

A new type of electric traveling crane for use in steel mills has been brought out by the Shaw Electric Crane Company, 85 Liberty street, New York City. Provision has been made, it is stated, for all of the standard safety features as required by the safety specifications of the



A Recently Developed Trolley for Overhead Traveling Cranes Designed Especially for Steel Mill Use

United States Steel Corporation. A view of the trolley used with the crane is given in the accompanying illustration.

Steel is used throughout in the construction of the trolley structure, which consists of two heavy side frames connected by two girts. One of these carries the hoist motor and the electric brakes, while the other supports the trolley motor. The upper sheaves are mounted in a structural load girt, supported by brackets on the side frames. This arrangement, which is known as the loose girt feature, causes the brunt of the load, it is pointed out, to be borne independently of the girt carrying the hoist and trolley motors. The trolley truck journals are of the M. C. B. type with half-hexagon bronze bushings and oil waste cellars with tightly fitting covers. The four truck wheels are keyed to short axles, all of which are exactly alike and are interchangeable. The two wheels on one end of the trolley are independently driven from the cross shaft. Bronze bushings are provided for the bearings, and either ring oiler or grease cup lubrication can be used.

There are only two reductions in the hoisting train and also in the trolley drive, and the four bearings are alike and interchangeable in both. The gears are of cast steel, with machine-cut teeth, while all the pinions are cut from solid, forged steel blanks. The gears are all inclosed in substantial cases, and none are overhung. The drum gear is pressed on and keyed to the drum, which has machine-cut grooves and safety flanges of ample diameter.

The upper and lower sheaves, which are of cast steel, are the same diameter as the drum. The construction, together with the sheave pins and nuts, is identical, and thus the various sheaves may be interchanged. A steel casting fitted between the side plates serves to guard the lower sheaves, and the hook swivels on ball bearings.

The trolley is arranged to accommodate either the builder's multiple-washer mechanical load brake, or a dynamic lowering brake. When the latter is used, two electric brakes are generally provided, one on an extension of the motor shaft and the other on the intermediate shaft, the arrangement being shown in the accompanying illustration.

A High-Speed Automobile Motor Test Record.—At the automobile testing plant of the Worcester Polytechnic Institute, Worcester, Mass., a speed record of 3310 r.p.m. for an automobile motor was recently established. The conditions under which the tests were made approximated, as closely as possible, actual service conditions on the road. A dynamometer indicated that the 20-hp. rating of the motor was reached at 1120 r.p.m. At 1900 r.p.m., 30 hp. was developed, and at the maximum speed, 3310 r.p.m., 36 hp., which was equivalent to a speed of 89 miles per hour, was developed. At about 3300 r.p.m. the power curve began to drop.

A Remarkable Cupola Explosion

Probably Due to the Rapid Formation of Carbon Monoxide—Precautions to Be Taken

In *Stahl und Eisen* for June 26 is an interesting article by R. Fichtner, describing a remarkable cupola explosion and its probable causes. The explosion occurred at a plant in Bohemia, the plan of the furnaces being shown in Fig. 1. Two cupolas, Nos. 1 and 2, are connect-

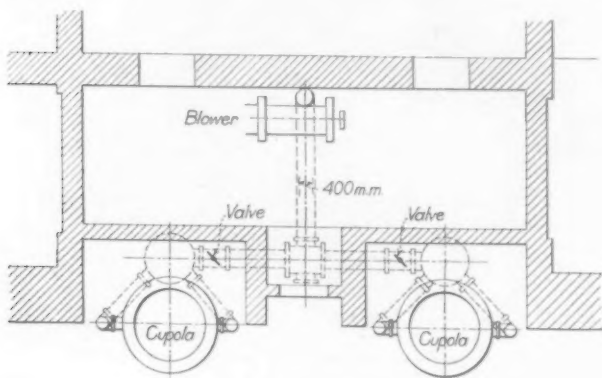


Fig. 1—Plan of the Cupola

ed to an Enke blower, and by means of two valves the blast can be admitted to one furnace while the other is not running. No. 2 is the cupola that suffered from the explosion, and the details of the furnace are shown in Fig. 2. Its normal output is four tons per hour. The tuyere arrangement is rather unusual. There is a lower ring of four circular tuyeres, and four series vertically arranged, but examination after the explosion showed that the upper vertical tuyeres were bricked up. The cupola, which was 18 years old, was freshly lined and had been in operation for three days without developing any irregularities. The blast pressure shortly before the explosion was 0.78 lb. per sq. in., 21 tons of metal had been tapped, and at the moment of explosion the furnace contained three tons of unmelted metal and about one-half ton of molten iron. The explosion was very violent, and the shell was torn open at the riveted seam. The blowing engine was blown to pieces, but the blast mains were unharmed. Four men were more or less seriously hurt. Regarding conditions shortly before the explosion the workmen reported that nothing special was noticed. The charge did not stick or hang but the blue flames above the charge were much smaller in amount than usual. The blast was put on three hours before the explosion and was not shut down except for a few seconds, about one minute before the explosion, due to the belt slipping from the pulley. It may be mentioned that none of the charge was blown through the charging door or shaft by the explosion, the valve in the blast main was open and could not close automatically, and water was not used around the cupola.

The operation of a cupola produces carbonic acid and carbonic oxide gas, together with nitrogen and often free oxygen. Carbonic oxide possesses the property of forming an inflammable or explosive mixture with air, not when present in any amount, but within certain well-defined limits, the range within these limits being known as the explosion range. These limits for various gases are given below:

	Lower limit, per cent.	Upper limit, per cent.
Carbonic oxide.....	16.4	75.1
Hydrogen.....	9.4	66.5
Water gas.....	12.3	66.9
Acetylene.....	3.2	52.4
Illuminating gas.....	7.8	19.2

It is evident therefore that carbon monoxide has the greatest explosion range, but that its low limit is above that of other gases. The large range is not so important in our case because even with the best gas producer practice only about 33 per cent. carbon monoxide is present in the gas. If the combustion of the coke in cupola practice is incomplete considerable carbon monoxide may be formed, and with the entrance of air an explosive mixture can form and cause an explosion.

The recent researches of Dr. Hüser have shown that when starting up a cupola the action is similar to that of a gas producer, and considerable carbon monoxide is formed. Only after a considerable time, one-half hour to one hour, does the carbon dioxide percentage increase to the normal amount. Up to this time the upper part of the cupola is filled with blue clouds of inflammable gas, which ignite as the upper layers of the charge become hotter, often with a loud noise and explosive violence. These explosions can easily be prevented by igniting the gases after admitting the blast with a lighted ball of oily waste. This flame above the charge does not always appear accompanied by an explosion, but usually ignites quietly soon after starting. Such an explosion can also take place after the furnace has been in blast a considerable time. It often happens during operation that the blast is stopped for some reason. The coke is still incan-

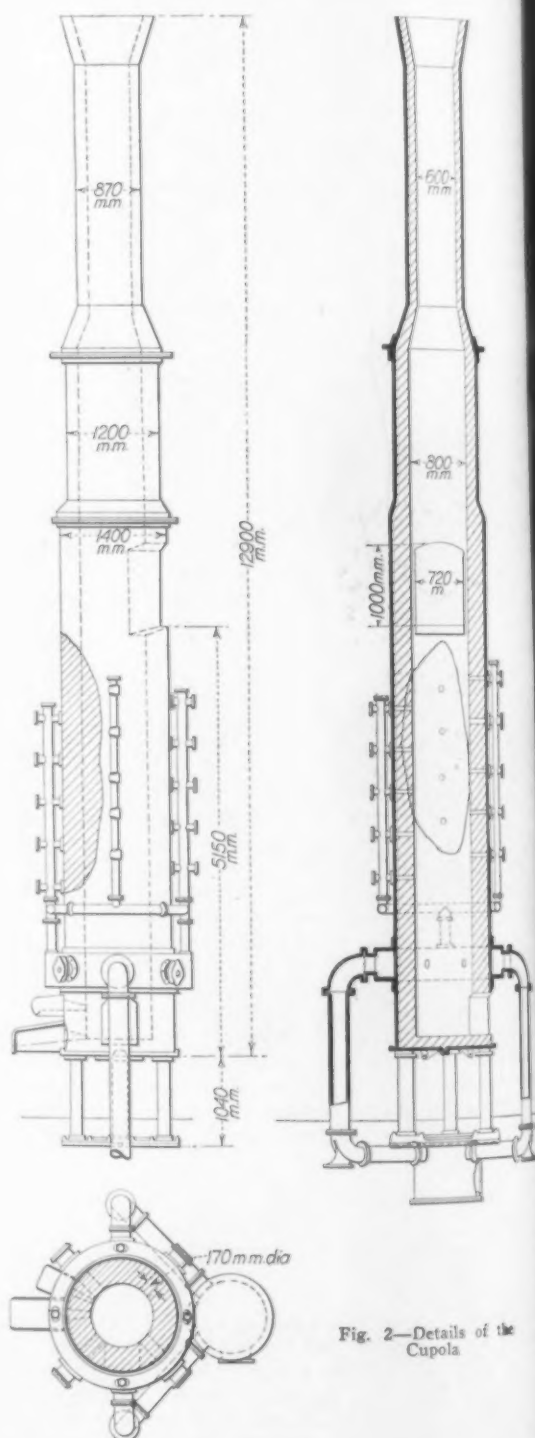


Fig. 2—Details of the Cupola

descent, and as the supply of air is shut off the carbon dioxide present is quickly reduced to monoxide and fills the whole furnace. If the valve is not closed it will enter the blast main when the stoppage is a long one. Then, when the blast is again started, the air enters very quickly

forms a mixture with the carbon monoxide. In the lower part of the cupola it burns to dioxide, the flame penetrates the upper part of the cupola where the charge is too cold to ignite the gas, but where the air has already penetrated. There is an explosion which usually makes a loud noise and expels a large flame from the throat. Dirty tuyeres may give rise to similar results because only a moderate amount of air is admitted and carbon monoxide can form. Then when the tuyeres are cleaned the air rushes in quickly and an explosive mixture may easily be the result. A hanging of the charge, the formation of scaffolds and hollow places in which carbon monoxide may collect may also cause an explosion. In all cases cupola explosions are due to this carbonic oxide gas, with the possible exception of explosive materials introduced with the charge.

In the particular case under discussion it is believed that the explosion was also due to carbon monoxide. It is known that shortly before the occurrence the blast was off for several seconds. The exact time is open to doubt and what is meant is undoubtedly a short time. However, the fact of the belt slipping is also important. The blast entering the furnace would be intermittent, combustion would cease, and carbonic acid gas be reduced, the furnace in the short interval filling with carbon monoxide. After the belt was adjusted the blast was again introduced in full force, and the explosion took place. It is probable that exactly the right amount of air was introduced to give the proper mixture for the greatest possible explosion. From the fact that none of the charge was blown from the throat, it is presumed that the shell of this 18-year-old veteran was not in very good condition. A core at a riveted joint and it is not improbable that some rivets had been sheared off, and the steel badly rusted. The charge, which might have scaffolded, offered more resistance than the shell. The fact that there was but little flame at the throat was probably due to the intermittent character of the blast.

Brief mention may be made of the precautions that should be taken in operation to avoid such explosions. Before starting great care should be taken that the cupola is thoroughly heated through. Regular and uniform charging, with the avoidance of very large pieces, tends to prevent hanging and scaffolding. The tuyeres should always be kept clean, and if the blast is shut off for any reason, one or more tuyeres should be opened to the air. This allows air to enter the cupola under the influence of the draft of the stack, and a collection of considerable carbonic oxide in the furnace is prevented. Also a valve should be placed in the blast main close to the furnace which can be closed when the blast is off to prevent inflammable gases entering the mains; then when the blast is started up again it should be opened slowly. If the cupola has a forehearth, the latter should be provided with a valve at its highest point which can be opened from time to time, if the blast is shut off, to allow the gases to stream out and burn in the air. Further, when the furnace is reduced, the brick should not be set close up against the shell, but space should be left for an outside layer of sand. This allows for the expansion of the brick which otherwise would bring about severe stresses on the rivets and possibly shear some of them thus weakening the shell. Finally, the blowing engines should be given constant supervision to see that everything is in good condition. G. B. W.

A correction should be made of the statement in the issue of *The Iron Age* for August 7 that the methods of chemical analysis contained in a pamphlet issued by the Th. Aldschmidt Thermit Company, 90 West street, New York, are those used in the laboratories of Dr. Fresenius, Wiesbaden, Germany. These methods are those used by Th. Aldschmidt Aktiengesellschaft, but were approved by the Fresenius laboratories after having been submitted to them for trial.

At the regular monthly meeting of the American Society of Engineer Draftsmen, which will be held in the World Building, Brooklyn Bridge, New York, August 22, 8:15 p. m., John W. Morton will read a paper on "The Universal Joint," illustrated by stereopticon, and Charles Bennis, of the Teachers' College, Columbia University, will deliver a lecture on "Spiral Gear Calculations."

Interstate Commission Investigates Railroad Scales

WASHINGTON, D. C., August 11, 1913.—The Interstate Commerce Commission last week gave out its report "in the matter of the investigation of alleged irregularities and discrepancies in the weighing of freight by carriers subject to the act to regulate commerce." Among other things it said: "The record herein discloses that a majority of the track scales now in use should be at once rebuilt in order to obtain reasonably accurate results. It is also apparent that many additional scales should be installed."

The investigation on which the report is based was undertaken in consequence of numerous complaints that the weights on which freight charges were assessed were grossly inaccurate and that great difficulty was experienced in correcting the inaccuracies. The principal complaint was against carload weights, and the weighing of carloads by track scales has been the principal subject investigated, although some attention has been incidentally given to platform scales. The commission recommends:

"That some Federal tribunal, perhaps this commission, should be given authority in the following respects: (a) To fix the points at which track scales shall be installed; (b) to prescribe the standard of such scales and their installation; (c) to test or supervise the testing of such scales; and (d) to supervise the operation."

The report says that no attempt will be made at this time by the commission to enter upon any discussion or to make any suggestions as to most of the rules which should govern the weighing of freight and the correction of incorrect weights, and it adds: "Representative shippers have this matter under consideration with the carriers, and it is expected that as a result of these conferences satisfactory rules will be formulated. If not, the matter will be further proceeded with by the commission, and any particular rule can be made the subject of complaint."

The investigation was an extended one. Hearings were held in all parts of the country, occupying 46 days, and the report says: "Looking at conditions as they existed when the order instituting this investigation was made, on January 15, 1912, this can be affirmed with some confidence: Three-fourths of all the track scales in use in the United States were of defective design or improperly installed. Less than one-fourth were properly inspected. Not more than 10 per cent. were accurately tested, and a majority were not in any proper sense tested at all. The methods of weighing were heedless and unsatisfactory in many cases. The stenciled tare weights on 80 per cent. of all cars were erroneous. While check weighing at certain points where better facilities were available and superior operating conditions prevailed tended to reveal many of the original erroneous weights, these changes in the original weight were a source of constant irritation and inconvenience to shippers." W. L. C.

Annual Exposition for St. Louis

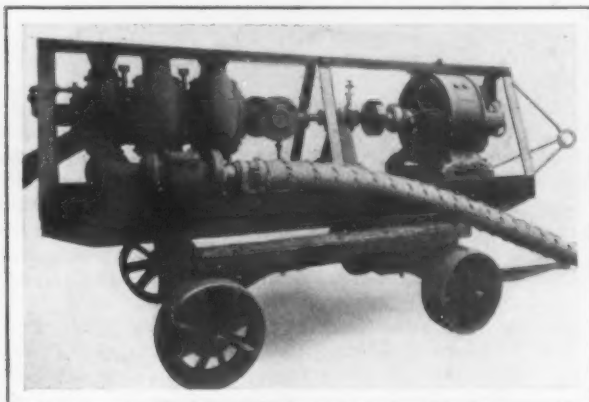
St. Louis merchants and manufacturers are arranging for an annual exposition on a large scale. Organization was recently effected under the title of the St. Louis Fair & Exposition Company, with the following officers: President, Horace S. Rumsey, vice-president L. M. Rumsey Mfg. Company; first vice-president, Robert McCulloch; second vice-president, J. E. Turner; third vice-president, Fletcher R. Harris; fourth vice-president, A. L. Shapleigh, treasurer Shapleigh Hardware Company; fifth vice-president, Charles A. Stix; sixth vice-president, M. L. Wilkinson; seventh vice-president, Julius S. Walsh, Jr.; secretary, L. W. Childress, president Columbia Transfer Company; treasurer, A. O. Wilson, vice-president State National Bank. The company will be incorporated with a capital stock of \$1,000,000 and will acquire from 150 to 250 acres in St. Louis County and as near the city limits as possible. The intention is to erect buildings of a permanent type, thoroughly fireproof, especially adapted to exposition purposes.

The forging of an 80-ton steel ingot for the rudder shaft for the steamship *Vaterland* by Haniel & Lueg, Düsseldorf, Germany, was the subject of some illustrations shown in the building of the Stahlwerk-Verband, at the Leipzig Exposition. The forging was done with a 4000-ton Haniel & Lueg steam-hydraulic forging press.

Mechanical and Civil Engineers,
PITTSBURGH, PA.

An Electric Pump for a Wide Range of Heads

An interesting application of a motor-driven pump has been made by the United Iron Works, Oakland, Cal., and the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., working in conjunction. This pump is designed for mine drainage and is to be used on inclines up to



A Three-Stage Motor-Driven Mine Drainage Pump Designed for Operation on Inclines Up to a Maximum of 45 Deg.

a maximum of 45 deg. In connection with the design of this pump, there were two problems of more than ordinary interest to be solved. In the first place the pump had to operate against practically no head, which was to be increased by lowering 20 ft. at a time until a head of 260 ft. was reached. The problem of lubrication was also interesting, as the incline at the surface was on an angle of 30 deg., while at the 500 ft. level, the shaft was practically vertical.

The outfit supplied consists of a 4-in. three-stage centrifugal pump with an automatic hydraulic balance. It is mounted in a channel iron frame with an eye at one end to which a cable or rope is attached for lowering along the incline. The lower part of the framework acts as a skid.

As has been mentioned, the head was increased in 20-ft. steps up to a maximum of 260 ft., where the mine supply was connected with a stationary pump at that level. From this point, the pump was again started under the no-head conditions and continued to operate until the 500-ft. level was reached, it being necessary for the pump to balance under any and all heads between zero and a maximum of 260 ft. For lubrication, it was found necessary to provide the motor with an oiling device which would operate in either a horizontal or vertical position, or at any intermediate angle. An oil bowl was placed upon the motor shaft adjacent to the coupling, and a small pipe was led to the top of the motor shaft. The oil was turned in here and passed through the bearing, being caught in a reservoir that was piped to the top of the lower bearing, through which it passed into the oil bowl, and was then returned to the top of the motor shaft, to be used over and over again. When the motor was in the regular horizontal position, ring oiling devices of the customary character were used.

The pumps are driven by a Westinghouse type SK 30-hp. 230-volt direct-current motor operating at a speed of 1700 r.p.m. A rubber blanket was used at first to protect the motors from the drip, but as this is excessive, it is planned to use a galvanized rain shield, which will be so constructed as to allow of ample ventilation. Two of the units were furnished to the Stone Cannon Coal Company, San Francisco, and have a capacity of 225 gal. per min. at heads ranging from 0 to 260 ft.

Liquid air is being experimented with in Germany in mine explosives. Mixed with aluminum powder and detonated it forms an explosive about two and one-half times as powerful as black powder. Its peculiar advantage is that there can be no deleterious fumes, the products of the explosion being oxygen and ammonia.

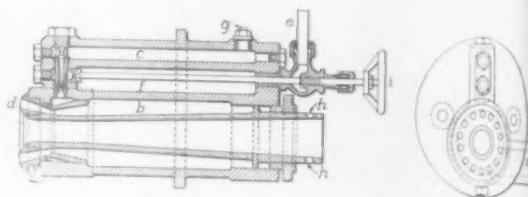
Since the recent annual meeting of the American Society for Testing Materials at Atlantic City, thirty persons and firms have been elected members, bringing the total membership of the society to 1604.

New Burner for Low-Grade Oil Fuels

A new burner has been invented by the chief engineer of the Siderurgica Steel Works in Italy. It has been experimented with on several boilers of different types and in a continuous reheating furnace. In 24 hr. 100 tons of 3000 kg. ingots were heated with a consumption of 8000 kg. of refuse oil. The same result can be obtained with any oil. One of the advantages of the new burner, which has been patented in the United States and Europe, is that it does not need any special attention since it does not clog easily and once started and regulated works equally well with any oil or steam pressure. The apparatus as cast in iron weighs 35 kg. and has a consumption on boilers of 200 to 250 kg. of combustible material per hour vaporizing 10 kg. of water for every kg. of combustible matter.

A description of it is as follows: Pipe *a* is for the steam or air pressure, communicating with the chamber *b*, from which it flows out through the holes in the pipe. Pipe *c* is for the oil, tar, petroleum, etc., and leads to the chamber *f*, which is surrounded by the steam which is in the chambers *b* and *c* for combustibles which are not sufficiently fluid to flow without being heated. Pipe *g* serves for the steam or air which from *c* passes through the projecting cone, drawing the fuel vaporized in the mixing chamber *f* after valve *i* has been opened.

The fuel then passes through chamber *b* where it obtains more air or steam so as to burst into flame through the holes at *d*. By adjusting the central cone or pipe *h* means of the holes at *n* it is possible to regulate the flame without touching the steam or fuel valves. The apparatus



New Burner for Low-Grade Oil Fuels

has a small pipe in the center to deliver air when necessary so that better combustion can take place. Analysis of the products of combustion in the chimney shows that combustion was complete. In the reheating furnace the temperature when burning refuse oil rose to 1200 deg. C.

Anticipating Customers' Complaints of Delay

An interesting pamphlet entitled "Beating the Customer to a Kick," reproducing an article by P. L. Frailey, manager of publicity of the Brier Hill Steel Company, Youngstown, Ohio, published in the July issue of *Business*, gives details of a progress report planned by that company for the purpose of offsetting the discomforting effects of unavoidable delays frequently experienced by steel mill practice. When the rolling of the order is completed, a form is filled out to indicate this and mailed to the buyer. On this form the date on which shipment was promised is displayed and a note reads: "Information as indicated below will be sent you from each department showing the progress of your order. By transferring from the several advice slips thus received to this sheet an up-to-date progress report will be at your hand." If, after rolling, the order requires to be galvanized, a report from that department is made out on completion of the process. If painting is the order, a similar form is made out by the painting department and sent to the buyer. After shipment is made, a third postcard advises the customer and a note tells him "From now until arrival at destination your shipment will be given attention by our traffic department."

In this way the customer is kept so well informed of the progress of his order that if there is any failing on the mill he knows it before he can suspect it. At the same time, a corrective influence on mill practice is exerted through the constant tracing by the service department of every promise order.

A New Up-draft Rotary Gas Producer

The Reading Iron Company, Reading, Pa., has recently placed on the market a rotary gas producer of the up-draft type. It is designed to gasify anthracite, lignite and practically all grades of bituminous coals for both power and furnace work. A feature of the producer is the mechanical agitation of the fuel bed by a rotating water-sealed ash tray. The control of the gas generation, it is pointed out, does not require highly skilled supervision.

The ash tray, it is emphasized, by its rotary movement gradually and evenly works the ash out of the water seal, where it may be removed conveniently, without disturbing the fuel bed in any way. Projecting ribs, which are provided for both the ash tray and the heavy bosh casting, act as a crusher for breaking up the ash and facilitating its removal. It is thus possible to adjust the fuel bed level readily and the delivery of the ash may be stopped at will, if desired, to prevent excessive sinking of the fuel bed. The combustion zone can be located conveniently by sight holes in the lower part of the producer shell, an arrangement which, it is found, enables the attendant to maintain a constant depth of fuel bed. In large plants, where coal is burned at a thoroughly uniform rate, an ash plow or scoop is used to remove the ash from the tray continuously.

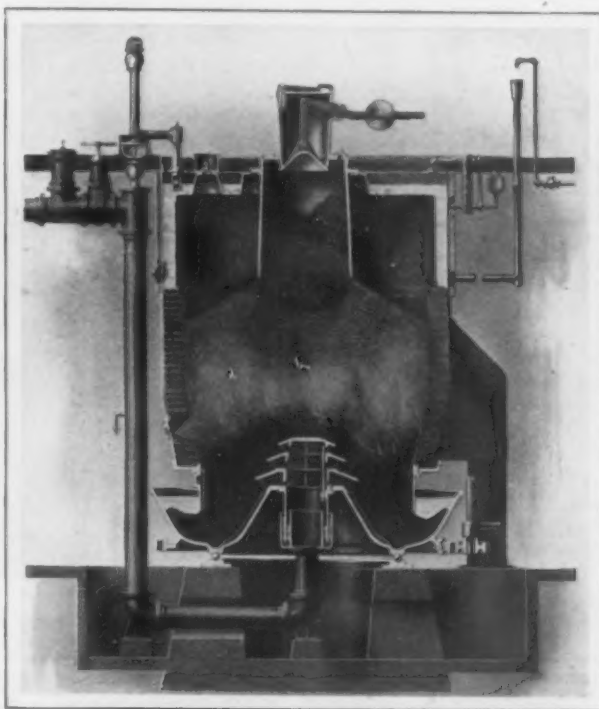
A ratchet drive, which is not shown in the accompanying engraving, actuates the ash tray, and while the ratchet may be worked intermittently by hand, a continuous power drive is preferred. If the tray should become bound, the ratchet is automatically disengaged by a safety device. The rate of rotation of the tray is slow, a few revolutions per hour generally being sufficient to accomplish the desired result, but the rate of rotation may be altered while running by adjusting the ratchet travel. The tray is designed so that parts may be replaced without disturbing the setting of the stationary producer shell. If the driving power should fail at any time, the producer is operated as a fixed grate unit.

A uniform distribution of the air blast is an advantage claimed for the producer. The blast tuyeres comprise three separate mushroom heads, which are supported by and rotate with the ash tray, and a large area exposed to the fuel is provided to admit the blast freely into the bed. As noted in the illustration the passages feeding from the central blast supply pipe into the hood chambers are contracted, to insure the same pressure at each feed passage and an equal amount of blast discharged into each chamber. The varying diameters of the hoods are to secure a uniform, radial distribution of the blast over the entire fuel bed. This blast can be supplied by a reciprocating air pump, a fan blower or a steam jet blower, or if the producer is installed in connection with one of the builder's gas engines, which was illustrated in *The Iron Age*, May 22, 1913, the air pump is attached directly to the engine. This arrangement enables the generation of the gas to be regulated automatically to suit the engine requirements, and is adapted for variable-speed compressor drive.

In the type of gas producer illustrated, the hopper drops the coal into the fuel chamber or magazine, where it is held above the hot fuel bed. Here the moisture is driven off and the coal is subjected to a preliminary coking process before it settles into the fuel bed. The distilled hydrocarbons pass down and through the hot fire before escaping to the flue, and in this way a portion of the volatile matter is converted into fixed gases. This pre-heating of the inactive fuel, it is pointed out, permits the dumping periods to be prolonged without chilling the fire, even should the moisture content of the coal be high. These features are calculated to maintain a uniform quality of gas and especially fit the producer for engine work. Where certain caking grades of fuel, for which the fuel magazine is not adapted, are burned, the producer is built without this chamber, but in either case the method of feeding the coal is not dependent upon the rotary movement of the ash tray.

A superimposed vaporizer, which raises the steam required for saturating the air blast, also forms a part of the producer's equipment. This vaporizer, which is intended primarily for use in connection with gas power plants, consists of an annular water space, built into the upper part of the producer shell. The heating surface

is accessible and readily kept clean, and its proportions are figured to raise the required steam promptly when the producer is started. The heat of vaporization is derived largely from the waste heat of the flue gases. A pressure of a few pounds per square inch is carried, and



View Showing the Arrangement of the Various Parts of an Up-Draft Gas Producer with a Rotating Water Sealed Ash Tray

this is kept constant by a back pressure valve, while various appliances similar to those of a low-pressure steam heating system are provided to make the vaporizer safe. If desired, the superimposed vaporizer can be omitted, a high-pressure steam-jet blower being used to deliver the air blast instead.

Electric Steel Furnace Products

The Illinois Steel Company, Chicago, has issued a most attractive brochure entitled "Electric Steel." The company has for the past four years been using the Heroult electric furnace at South Chicago in further refining and purifying steel made by the open-hearth and Bessemer methods. The product thus secured is a steel of homogeneity and chemical purity, solid and dense in structure, while the quality is controlled with great accuracy. The use of this steel embraces practically the entire range of steel consumption where durability and resistance to wear and shock are essential features. It can be supplied by the company in many forms, such as rails, structural material, plates, bars, billets, blooms, etc.

Among the specific purposes where electric steel gives excellent results, the pamphlet mentions the following: Locomotive axles, side rods, piston rods, crank pins and tires; automobile gears, crank shafts, driving shafts, connecting rods, frames, springs and axles; for general uses, bit and jar steel for well-drilling purposes, general forgings, drop forgings and vehicle and coil springs.

Special attention is called to the fact that in the electric furnace ideal conditions obtain for the manufacture of alloy steels. Any practical composition can be supplied by the company, and the following are cited as among some of the grades that have been very successfully produced: Nickel steel, containing 3.25 to 3.75 per cent. nickel; low nickel-chromium steel, containing 1 to 1.50 per cent. nickel and from 0.30 to 0.70 per cent. chromium; medium nickel-chromium steel, containing from 1.50 to 2 per cent. nickel and from 0.75 to 1.25 per cent. chromium; high nickel-chromium steel, containing from 3.25 to 3.75 per cent. nickel and from 1.25 to 1.75 per cent. chromium. The carbon content in all these grades may range from 0.15 to 0.45 per cent. or higher, as desired by the purchaser.

Visit to the Becker Steel Works, Germany

Pouring Electric Steel Ingots—Making Steel Tubes—Test of High-Speed Steel

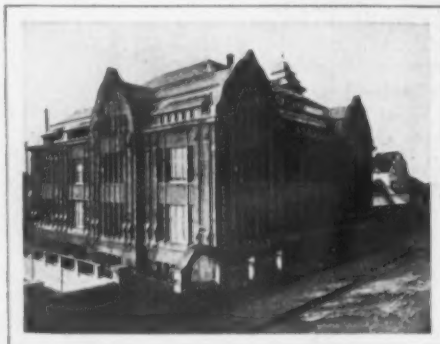
One of the interesting plants visited by representatives of the American Society of Mechanical Engineers, who toured Germany this summer, was that of the Stahlwerk Becker Aktien-Gesellschaft (in this country the Becker Steel Company of America), at Willich, near Krefeld, not far from Düsseldorf, Germany. The inspection of the works came not long after considerable publicity had been given to the remarkable results obtained with the company's Iridium high-speed steel, and one of the vivid impressions which the visitors carried away from the works was a spectacular test of this steel in cutting chrome nickel steel. Besides the manufacture of high-speed and other tool steel, the company also produces various alloy steels especially intended for structural purposes, as in the manufacture of automobiles, and also makes steel for ball bearings, seamless hot and cold drawn tubing, and steel for rifle barrels and armor plates. Owing to the size of the works and the necessarily abbreviated stay, it was not possible to ascertain all the interesting points doubtless to be observed, but the following rough notes will serve to indicate something of the character of the plant.

The works are notably modern in character and are located in two series of buildings on opposite sides of a wide transfer yard or

central stairway and hall, which remind one of a public structure.

Besides the tests of tool steel, particular attention was paid to the casting of high-speed steel ingots with steel from an electric furnace, and to the department where seamless tubes and cylinders are made.

One of the accompanying illustrations shows high-speed ingots being cast and the electric furnace in the background. The ingots are cast with heads of refractory material placed on the molds, so that the piping shall occur above the top, if possible, of the ingot proper, leaving the material remaining within the head something which may be removed readily from the ingot, thereby diminishing the likelihood of leaving impurities of blowholes within the ingot in the further process of rolling.



Office Building of Becker Steel Works

Incidentally the ingots are machined to remove outside scale, and rough forgings are watched for flaws, cinders or other defects, which are removed by chipping hammers. The electric furnace is of the Girod type of 2 to 4 tons contents, but at the time of the visit it was understood that 2 tons were poured every six hours. Besides the electric oven, there are crucible and open-hearth furnaces.

Another view is a reproduction of a photograph taken in the tube drawing mill, where there are horizontal and vertical hydraulic presses for making seamless tubing for the manufacture of ball bearings and of nickel steel tubing such as is used in airship building. In addition, there are also various hot and cold drawing benches, and the total power consumption in this department, which includes electrically driven apparatus for bringing the water to 300 atmospheres pressure, amounts to 1500 hp. Heated cylindrical bars cut to proper length are placed in a press and a ram is used to force out the center, resulting in an elongation of the bar and leaving a hollow cylinder or tube with one end open, that at which the ram entered. Such seamless tubes of nickel steel can be cut, for example, into disks, to form the ball races for ball bearings.



Hot Drawing of Steel Tubes.

court. The material in process of manufacture travels generally from one end of the plant through the buildings along one side and returns through the group of buildings on the opposite side of the central place, reaching finally the shipping department. The buildings themselves are architecturally quite pleasing, and owing to their modern character are well provided with glass surface. The plant is further set off with an office building of striking appearance, as the small accompanying reproduction of the exterior may help in showing. This building is in brown stone, and its interior is quite in keeping as regards the finish of the rooms and appointments, together with a

the high-speed steel included a continuous test of an Iridium steel lathe tool and also one of a twist drill made of the Becker Modern steel. A large cylinder of nickel chrome steel was being cut by the Iridium tool, with a chip so large and removed so readily that the attention of the passer-by was immediately arrested. The chip corresponded to a feed of nearly $\frac{1}{4}$ in. with a depth of cut of as much as $1\frac{1}{16}$ in. and the cutting speed was 12 meters per min., or nearly 40 ft. The steel cut was one of 0.20 per cent. carbon, 3.5 per cent. nickel and 0.7 per cent. chromium. The speed of cutting and the amount of metal removed are different from the tests noted of

medium steel in *The Iron Age* of June 19 and July 3.

In testing the twist drill of the Modern steel, a piece of machine steel with 1 to 1.20 manganese, and 0.30 to 0.35 carbon, and about $3\frac{1}{2}$ in. thick was drilled. The diameter of the drill was 40 mm., or about $1\frac{9}{16}$ in. diameter, and rotating at speed of 300 r.p.m., or with a peripheral speed of $111\frac{1}{2}$ ft. per min., the steel was cut through in seconds.

The power demands of the plant are somewhat great and a central power plant of considerable interest has been provided with three steam engines and a combined high and low-pressure turbine of 2500 hp, altogether having a total of 6200 hp in electrical energy. The steam is generated in an adjoining boiler room at a pressure of 13 atmospheres at 332 deg. C. superheat, this supplying also the steam for the forging shop. Besides the forging shop, which contains some ten steam hammers and a hydraulic press of 1200 tons capacity, there are the rolling mill for reducing the ingots and the wire and bar drawing mill, and, of course, also the annealing and hardening plants.

The Becker Steel Works was founded in 1908, and has a capital of \$1,500,000 and a bonded indebtedness of \$1,250,000. The plant occupies an area of about 20 acres and is equipped for a yearly production valued at \$3,000,000 to \$3,500,000. In full swing 1000 men are employed. Quite a little attention has been paid to the comfort of the employees and there is a special building accommodating a large number of shower baths separated by wire glass partitions and paved with tiled floors. Both hot and cold water are supplied to wash troughs, and individual sheet metal lockers are provided. Another building accommodates a large dining room, and on the walls of this at the time of the visit were displayed the plans of workmen's dwellings which the employees are encouraged to buy with the assistance of the Becker Company. For example, mention is made of a dwelling which the employee is given 35 years to buy at the rate of 300 marks or \$75 per year. Some 15 per cent. of this is paid by the pension bureau of the works, and a charge of $3\frac{1}{2}$ per cent. is made for the money involved.

The Liquid Contraction of Cast Iron

Pouring at High Temperatures Found by a Carnegie Investigator to Be the Preventive

In a Carnegie memoir for 1913 to the Iron and Steel Institute, London, George Hailstone, Birmingham, presents the results of an investigation of the liquid contraction in iron. The object of the investigation was "to solve, if possible, the reason why certain gray iron castings used in the engineering world contain subcutaneous cavities, which are a source of great trouble to high speed and hydraulic engineers, inasmuch as very frequently a casting when machined, is apparently sound, but when subjected to a hydraulic test is found to be leaky." Longmuir originated the term "liquid contraction" to distinguish the liquid contraction which takes place in the heavy part of a casting when the outside skin has solidified. Solid contraction is the natural contraction which metals undergo when passing from the hot to the cold condition, and is known as shrinkage. There is no doubt that these two forms of contraction are closely related as regards occurrence and extent. Conditions which conduce to



Casting High Speed Steel Ingots; Electric Furnace in Background

maximum or minimum solid contraction are those which conduce to maximum or minimum liquid contraction.

Most foundrymen agree, says the author, that castings run with "dull" or "cold" iron do not so readily "sink" or "draw" as when the metal is run hot. This is true when the casting is only examined for surface defects. Mr. Hailstone states, however, that while "sinking" and "drawing" may be reduced to a minimum by pouring with dull iron, liquid contraction is reduced to a minimum by pouring with iron as hot as it is possible to obtain without actually boiling the metal. To prove this statement the author selected a certain important class of castings, which used to be the source of a great deal of trouble, being leaky when subjected to a hydraulic pressure test. Chemical analysis gave no clue to the cause, so an extended scheme of investigation was carried out. It embraced the pouring of these castings under varying conditions and then subjecting them to the measurement of micro-constituents, specific gravity determination, hardness, influence of gases, etc. The experiments and determinations were very carefully and exhaustively carried out and are reported in full in the memoir. From these tests and from the results of many unrecorded but confirmatory tests, the author concludes:

1. Liquid contraction is accompanied by a lowering of the specific gravity or density.
2. Casting temperature is one of the ruling factors in obtaining a dense and solid casting, and therefore also affects the liability to liquid contraction.
3. When castings have been cast with iron hotter than will conduce to liquid contraction, solid and dense castings result; when cast with iron too cold to conduce to liquid contraction, blowholes appear. Hence the series of conditions is: Cast hot gives dense castings; medium heat, liquid contraction; cold iron, blowholes.
4. The more regular the sizes of the microscopical constituents the less will be the liquid contraction.
5. Conditions which conduce to a maximum solid contraction conduce to a maximum liquid contraction.
6. Gases appear to be held in more intimate contact in cast iron poured at a high temperature, and therefore tend to produce a more solid and dense casting.

The research has dealt with iron of the better variety as being the most liable to be affected, and also having a tendency to cause the greatest worry and loss to the manufacturer in rejected castings. The author hopes, however, to continue the research with irons of the commoner variety.

Production of Finished Iron and Steel in 1912

Iron and Steel Merchant Bars, Concrete Reinforcing Bars, Skelp, Hoops, Bands, Rail Joints, Steel Railroad Ties, Sheet Piling, Nail Plate, Etc.

The Bureau of Statistics of the American Iron and Steel Institute publishes in Bulletin No. 8 statistics of the production of iron and steel merchant bars, concrete bars, skelp, nail plate, hoops, bands and cotton-ties, sheet piling, etc., in the United States in 1912; also statistics of the production of all kinds of finished rolled forms, as compiled by William G. Gray.

Iron and Steel Merchant Bars

The production of iron and steel merchant bars in 1912 amounted to 3,697,114 gross tons, against 3,047,362 tons in 1911, an increase of 649,752 tons, or over 21.3 per cent. Of the total in 1912 about 944,790 tons were iron, against about 835,625 tons in 1911, a gain of 109,165 tons, and about 2,752,324 tons were steel, against about 2,211,737 tons in 1911, a gain of 540,587 tons. In the following table the production of iron and steel merchant bars in 1912 is given separately by States. Horseshoe bars, bolt and nut rods, concrete bars, etc., are not included.

States—Gross tons	Iron	Steel	Total
Maine, Mass., and Conn.	24,252	11,246	35,498
New York	26,980	156,777	183,757
New Jersey	23,220	33,523	56,743
Pennsylvania	368,008	1,510,380	1,878,388
Virginia, Ky., Tenn., N. C., Ga., and Texas	39,661	4,887	44,548
Alabama	2,523	30,481	33,004
Ohio	88,785	305,789	394,574
Indiana	202,828	277,682	480,510
Illinois	61,488	319,380	380,868
Michigan, Wisconsin, and Missouri	67,025	84,496	151,521
Kansas, Colorado, Washington, and California	40,020	17,683	57,703
Total for 1912	944,790	2,752,324	3,697,114
Total for 1911	835,625	2,211,737	3,047,362
Total for 1910	1,074,163	2,711,568	3,785,731
Total for 1909	952,230	2,311,301	3,263,531
Total for 1908	685,233	1,301,405	1,986,638
Total for 1907	1,440,356	2,530,632	3,970,988
Total for 1906	1,481,348	2,510,852	3,992,200

In 1912 there were 146 plants in 23 States which rolled iron or steel merchant bars, as compared with 138 plants in 24 States in 1911. Pennsylvania made over 50.8 per cent. of the total production of merchant bars in 1912, against nearly 50.2 per cent. in 1911; Indiana, nearly 13 per cent., against over 10.9 per cent. in 1911; Ohio, over 10.6 per cent., against over 9.8 per cent. in 1911; Illinois, over 10.3 per cent., against nearly 12.1 per cent. in 1911. These four States made over 84.7 per cent. of the total output in 1912, against over 83 per cent. in 1911.

The production of iron and steel merchant bars is given by States in the following table from 1907, 1910, 1911 and 1912:

States—Gross tons	1907	1910	1911	1912
Me., Mass., and Conn.	55,964	44,882	31,983	35,498
New York	154,284	97,478	110,682	183,757
New Jersey	73,643	46,986	46,197	56,743
Pennsylvania	2,051,103	1,994,092	1,528,771	1,878,388
Del., Md., and Va.	42,239	10,546	16,764	3,674
W. Va., Ky., Tenn., N. C., Ga., and Tex.	56,482	52,259	48,881	40,874
Alabama	61,552	31,389	28,591	33,004
Ohio	483,531	407,012	300,655	394,574
Indiana	258,565	291,728	334,155	480,510
Illinois	347,798	483,257	368,465	380,868
Mich., Wis., and Mo.	311,313	252,468	162,719	151,521
Kan., Col., Wash., Wyo., Ore., and Cal.	74,514	73,634	69,499	57,703
Total	3,970,988	3,785,731	3,047,362	3,697,114

Bars for Reinforced Concrete Work

The production of iron and steel bars for reinforced concrete work in 1912 amounted to 274,332 tons, as compared with 258,741 tons in 1911, an increase of 15,591 tons, or over 6 per cent. Of the total in 1912 about 2500 tons were iron, as compared with about 2388 tons in 1911, and about 271,832 tons were steel, as compared with about 256,353 tons in 1911.

In 1912 there were 36 plants in 16 States which rolled iron or steel bars for reinforced concrete work, as compared with 33 plants in 16 States in 1911. Pennsylvania made over 26.8 per cent. of the total production in 1912, against over 29.1 per cent. in 1911, and New York made over 24 per cent., against over 21.9 per cent. in 1911.

The following table gives the production by States of concrete bars in 1912, iron bars being separated from steel bars.

States—Concrete bars	Iron	Steel
Maine, New York, and New Jersey	69,755	69,755
Pennsylvania	73,639	73,639
Georgia, Alabama, and Texas	13,005	13,005
Ohio	8,728	8,728
Indiana	24,902	24,902
Illinois	33,803	33,803
Michigan, Wisconsin, and Missouri	18,907	18,907
Colorado, Washington, and California	2,500	29,093
Total for 1912	2,500	271,832
Total for 1911	2,388	256,353
Total for 1910	4,645	236,464
Total for 1909	159,352	159,352

The following table gives the production by States of concrete bars from 1909 to 1912. Statistics are not available prior to 1909.

States—Concrete bars	1909	1910	1911	1912
Maine, New York, and New Jersey	36,516	67,642	59,395	69,755
Pennsylvania	29,887	71,081	75,525	73,639
Georgia, Alabama, and Texas	1,500	3,260	8,181	13,005
Ohio	71,032	53,788	55,008	8,728
Indiana	5,564	21,119	16,140	24,902
Illinois	11,385	13,985	26,941	33,803
Michigan, Wisconsin, and Missouri	2,000	2,958	18,907	18,907
Colorado, Wash., and California	3,468	8,234	14,593	29,093
Total	159,352	241,109	258,741	274,332

Iron and Steel Skelp

The production of iron and steel skelp in 1912 amounted to 2,446,816 tons, as compared with 1,980,673 tons in 1911, an increase of 466,143 tons, or over 23.5 per cent. Of the total in 1912 about 327,012 tons were iron, as compared with about 322,397 tons in 1911, an increase of 4615 tons, and about 2,119,804 tons were steel, as compared with about 1,658,276 tons in 1911, an increase of 461,528 tons.

In the following table the production of iron skelp in 1912 is separated by States from the production of steel skelp.

States—Gross tons	Iron	Steel	Total
Ohio	63,987	1,037,715	1,101,702
Pennsylvania	238,441	813,932	1,052,373
New York and West Virginia	24,584	246,290	270,874
Wisconsin	21,867	21,867	43,734
Total for 1912	327,012	2,119,804	2,446,816
Total for 1911	322,397	1,658,276	1,980,673
Total for 1910	350,578	1,477,616	1,828,194
Total for 1909	370,151	1,663,230	2,033,381
Total for 1908	297,049	853,534	1,150,583
Total for 1907	444,536	1,358,091	1,802,627
Total for 1906	391,517	1,137,068	1,528,585
Total for 1905	452,797	983,198	1,435,995

In 1912 there were 43 plants in 5 States which rolled iron or steel skelp as follows: New York, 2; Pennsylvania, 26; West Virginia, 4; Ohio, 10; and Wisconsin, 1.

Ohio made over 45 per cent. of the total production of skelp in 1912, as compared with over 45.2 per cent. in 1911, and Pennsylvania made over 43 per cent., as compared with over 43.3 per cent. in 1911. These two States made over 88 per cent. of the total output in 1912, as compared with over 88.5 per cent. in 1911.

The following table gives the production of iron and steel skelp by States for 1907, 1910, 1911 and 1912 in gross tons:

States	1907	1910	1911	1912
Ohio	634,945	753,471	895,358	1,101,702
Pennsylvania	836,283	892,254	859,266	1,052,373
N. Y. and W. Va.	265,554	182,469	220,034	270,874
Ind., Ill., Wis.	65,845	—	6,015	43,734
Total	1,802,627	1,828,194	1,980,673	2,446,816

Nail Plate

The production of iron and steel plate for the manufacture of cut nails and cut spikes in 1912 amounted to 45,331 tons, against 48,522 tons in 1911, a decrease of 3191 tons, or over 6.5 per cent. Of the total production in 1912 about 36,658 tons were steel and about 8673 tons were iron, against about 38,571 tons of steel and about 9951 tons of iron in 1911. These figures are not included in the production of plates and sheets which has already been given.

The following table gives by States the production of

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and spike plate in 1907, 1910, 1911 and 1912, in gross

	1907	1910	1911	1912
States—Gross tons	32,004	24,479	26,176	22,033
Pennsylvania	13,179	14,945	20,293	19,848
West Va., and Ky.	6,844	5,870	2,053	3,450
Ill. and California	52,027	45,294	48,522	45,331

In 1912 11 plants in 5 States rolled iron or steel nail or spike plate, as compared with 12 plants in 6 States in 1911.

Miscellaneous Rolled Products

The production of spike rods, bolt rods, horseshoe bars, long angle splice bars, long tie-plate bars, hoops, bands, cotton-ties, strips, sheet piling, railroad ties, rolled axles, tires, steel wheels, scroll iron or steel, and other miscellaneous forms of finished rolled iron and steel is shown in the following table, iron products being separated from steel products. Rolled forging blooms and rolled forging billets are included, but forged armor plate, hammered axles, and other forgings are not included. For exports of blooms, billets, sheet bars, tinplate bars, and other semi-finished rolled products, as reported by the manufacturers, are included:

Miscellaneous rolled products—Gross tons	Iron	Steel	Total
Long angle splice bars, fish-plate bars, tie-plate bars, and other rail joint shapes	51,657	520,115	571,772
Sheet piling	22,276	22,276	22,276
Railroad ties	41,396	41,396	41,396
Bolt and chain rods, bolt and nut rods, horseshoe bars, strips, etc.	220,797	966,311	1,187,108
Forging blooms and billets	303	462,173	462,476
Exports of blooms, billets, sheet bars, etc.	347,783	347,783	347,783
Total for 1912	272,757	3,217,456	3,490,213
Total for 1911	199,172	1,831,042	2,030,214
Total for 1910	207,003	2,413,713	2,620,716
Total for 1909	250,110	2,005,132	2,255,242
Total for 1908	183,649	990,738	1,174,387

In 1912 the production of the miscellaneous rolled products above named amounted to 3,490,213 tons, as compared with 2,030,214 tons in 1911, an increase of 1,459,999 tons, or over 71.9 per cent. Of the production in 1912 about 272,757 tons were iron and about 3,217,456 tons were steel, as compared with about 199,172 tons of iron and 2,030,214 tons of steel in 1911.

In 1912 there were 15 plants in 6 States which rolled iron or steel hoops, 15 plants in 7 States which rolled iron or steel bands or cotton-ties, 33 plants in 10 States which rolled forging blooms or forging billets, 28 plants in 10 States which rolled long angle splice bars, fish-plate bars, tie-plate bars, and other bars for rail joint shapes, 2 plants in 2 States which rolled sheet piling, 3 plants in 2 States which rolled railroad ties, and 83 plants in 17 States which rolled spike and chain rods, bolt and nut rods, horseshoe bars, strips, shafting, finger bars, steel wheels, blanks for seamless tubes, and other miscellaneous forms. The number of plants which rolled billets, blooms, sheet bars, tinplate bars, etc., for export in 1912 was 14, located in 6 States.

All Kinds of Finished Rolled Forms of Iron and Steel

The phrase "rolled iron and steel" includes all iron and steel rolled into finished forms, as follows: (1) All sizes of iron and steel rails; (2) plate and sheet iron and steel; (3) iron and steel plates for cut nails and cut spikes; (4) spike rods; (5) iron and steel structural shapes; (6) merchant bars; (7) bars for reinforced concrete work; (8) sheet piling; and (9) long angle splice bars, tie-plate bars, fish-plate bars, sheet piling, railroad ties, cotton-ties, bands, hoops, bolt and nut rods, rolled axles, and other rolled products. Forged armor plate, hammered axles, and other forgings are not included, nor such intermediate rolled forms as muck bars, slabs, blooms, billets, tinplate and sheet bars, etc., unless these intermediate rolled forms have been exported, in which event they have been included for 1912 but not for prior years. Rolled forging blooms and billets are included for 1911 and 1912.

The production of all kinds of iron and steel rolled into finished forms in 1912, including rolled forging blooms and rolled forging billets, and semi-finished rolled products which were exported in that year, amounted to 1,637,582 gross tons, against 1,460,615 tons in 1911, an increase of 5,617,670 tons, or over 29.5 per cent. The maximum production was reached in 1912. Of the total production in 1912 about 23,019,259 tons, or almost 93.4 per cent., were rolled from steel, and about 1,637,582 tons,

or over 6.6 per cent., from iron, as compared with about 17,578,556 tons, or over 92.3 per cent., rolled from steel, and about 1,460,615 tons, or almost 7.7 per cent., rolled from iron in 1911. The following table gives by States the total rolled iron and steel production in 1912, as compared with the production in 1911, iron being separated from steel for 1912.

Finished rolled iron and steel	1912—Gross tons			Total in 1911
	Iron	Steel	Total	
Maine and Massachusetts	18,026	175,375	193,401	157,448
Rhode Island and Conn.	15,043	66,367	81,410	73,788
New York	84,523	949,548	1,034,071	768,763
New Jersey	36,960	138,183	175,143	154,563
Pennsylvania	735,008	11,519,032	12,254,040	9,426,827
Delaware and Virginia	18,299	14,589	32,888	30,487
Maryland	284,617	284,617	284,617	264,222
West Virginia	3,584	587,749	591,333	472,177
Ky., Tenn., N. C., Ga., Tex.	44,146	148,591	192,737	187,149
Alabama	2,523	529,724	532,247	356,609
Ohio	224,822	4,105,665	4,330,487	3,382,063
Indiana	222,613	1,651,293	1,873,906	1,156,411
Illinois	99,979	2,153,685	2,253,664	1,939,350
Michigan and Wisconsin	11,194	235,797	246,991	148,285
Missouri	68,582	14,301	82,883	68,961
Kansas, Colo., and Wash.	17,283	421,339	438,622	407,314
Oregon and California	34,997	23,404	58,401	44,754
Total	1,637,582	23,019,259	24,656,841	19,039,171

In 1912 there were 373 plants in 27 States which rolled iron or steel, as compared with 368 plants in the same number of States in 1911. Two States—North Carolina and Kansas—rolled iron products only in 1912, and 3 States—Delaware, Maryland, and Wisconsin—rolled steel products only in that year. With the exception of Oregon, whose only mill was idle in 1912, all the other States named in the table rolled both iron and steel.

The following table gives the production by States of all kinds of finished rolled iron and steel from 1909 to 1912. Rolled forging blooms and rolled forging billets are included for the four years, but semi-finished products rolled for export are included for 1912 only. Gross tons are used.

States	1909	1910	1911	1912
Me. and Mass.	169,855	171,782	157,448	193,401
R. I. and Conn.	120,922	121,065	73,788	81,410
New York	851,465	1,013,768	768,763	1,034,071
New Jersey	188,256	165,057	154,563	175,143
Pennsylvania	9,685,298	10,774,531	9,426,827	12,254,040
Delaware and Virginia	38,392	36,806	30,487	32,888
Maryland	324,173	307,837	264,222	284,617
West Virginia	455,949	405,925	472,177	591,333
Ky. and N. Car.	155,006	173,653	115,370	115,264
Tenn., Ga., Tex.	60,986	61,497	71,779	77,473
Alabama	257,972	426,471	356,609	532,247
Ohio	3,174,908	3,228,223	3,382,063	4,330,487
Indiana	965,621	1,310,645	1,156,411	1,673,906
Illinois	2,378,500	2,547,662	1,939,350	2,253,664
Michigan	56,735	62,398	26,914	28,737
Wisconsin	264,369	242,777	121,371	218,254
Missouri	79,691	84,320	68,961	82,883
Kan., Col., Wash.	364,495	437,685	407,314	438,622
Wy., Ore., and Cal.	52,097	49,177	44,754	58,401
Total	19,644,690	21,621,279	19,039,171	24,656,841

Leading Articles of Finished Rolled Iron and Steel

The following table gives the production of all leading articles of finished rolled steel in 1912, as compared with the production of leading articles of finished rolled iron in the same year. Rolled forging blooms and billets and semi-finished products rolled for export are included for 1912. In early years rolled iron was separated from rolled steel, but in 1891 this separation was discontinued and was not resumed until 1904.

Articles—Gross tons	1912—Gross tons		
	Iron	Steel	Total
Rails	75,044	3,327,915	3,327,915
Plates and sheets	8,673	5,800,036	5,875,080
Nail and spike plate	1,289	36,658	45,331
Wire rods	5,517	2,652,264	2,653,553
Structural shapes	944,790	2,840,970	2,846,487
Merchant bars	2,500	2,752,324	3,697,114
Bars for reinforced concrete work	327,012	271,832	274,332
Skelp, flue, etc.	51,567	2,119,804	2,446,816
Long angle splice bars, tie-plate bars, etc.	51,567	520,115	571,772
Hoops	270,007	270,007	270,007
Bands and cotton-ties	587,395	587,395	587,395
Sheet piling	22,276	22,276	22,276
Railroad ties	41,396	41,396	41,396
All other finished rolled products	220,797	966,311	1,187,108
Rolled forging blooms and forging billets	303	462,173	462,476
Exports of blooms, billets, sheet bars, etc.	347,783	347,783	347,783
Total for 1912	1,637,582	23,019,259	24,656,841
Total for 1911	1,460,615	17,578,556	19,039,171
Total for 1910	1,740,156	19,881,123	21,621,279
Total for 1909	1,709,431	17,935,259	19,644,690
Total for 1908	1,238,449	10,589,744	11,828,193
Total for 1907	2,200,086	17,664,736	19,864,822
Total for 1906	2,186,557	17,401,911	19,588,468
Total for 1905	2,059,990	14,780,025	16,840,015
Total for 1904	1,760,084	10,253,297	12,013,381

Total Production of All Kinds of Finished Rolled Forms

The total production of iron and steel rails, plates, sheets, wire rods, structural shapes, nail plate, merchant bars, and all other finished rolled products from 1887 to 1912 is given below. Rolled forging blooms and forging billets are included from 1905. Semi-finished products rolled for export are included for 1912 only. Prior to 1892 structural shapes were included with bars, hoops, etc.

Years.	Iron and steel rails.	Plates and sheets, except nail plate.	Wire rods.	Structural shapes, not including plates.	Nail plate.	Bars, skelp, and all other forms.	Total Gross tons.
1887	2,139,640	603,355	.....	.....	308,432	2,184,279	5,235,706
1888	1,403,700	609,827	279,769	.....	289,891	2,034,162	4,323,389
1890	1,885,307	809,981	457,099	.....	251,828	2,618,660	6,022,875
1895	1,306,135	991,459	791,130	517,920	95,085	2,487,845	6,186,229
1900	2,385,682	1,794,528	846,291	815,161	70,245	3,575,536	9,487,443
1905	3,375,929	3,532,230	1,808,688	1,660,519	64,542	6,398,107	16,840,000
1910	3,636,031	4,955,484	2,241,830	2,266,890	45,294	8,475,750	21,621,279
1911	2,822,790	4,488,049	2,450,453	1,912,367	48,522	7,316,990	19,038,171
1912	3,327,915	5,875,080	2,653,553	2,846,487	45,331	9,908,475	24,656,841

Finished Angle Splice Bars, Tie Plates, Fish Plates and Other Rail Joints

As shown below, the production of finished iron and steel angle splice bars, tie plates, fish plates, and other rail joints and fastenings in 1912 by rolling mills and steel works, not including spikes, bolts, nuts, and similar fastenings, amounted to 502,771 gross tons, of which 44,865 tons were iron and 457,906 tons were steel. Similar statistics for prior years are not available.

Articles—Gross tons	Iron	Steel	Total
Angle splice bars.....	3,557	177,604	181,161
Tie plates.....	39,039	197,502	236,541
Fish plates.....	2,266	11,098	13,364
Other rail joints.....	3	71,702	71,705
Illinois, Wisconsin, Colorado, and			
Total.....	44,865	457,906	502,771

The following table gives by States the production of finished rail joints and fastenings in 1912.

States—Gross tons	Iron	Steel	Total
New York, Pennsylvania, and Virginia	2,266	281,287	283,553
Alabama, Ohio, and Indiana.....	9,500	60,004	69,504
Illinois, Wisconsin, Colorado, and California	33,099	116,615	149,714
Total.....	44,865	457,906	502,771

The number of active works was 26, located as follows: New York, 2; Pennsylvania, 11; Virginia, 1; Alabama, 1; Ohio, 2; Indiana, 3; Illinois, 3; and Wisconsin, Colorado, and California, 1 each. There were 15 works in 8 States which made iron or steel angle splice bars in 1912; 15 works in 8 States which made tie plates; 5 works in 4 States which made fish plates; and 7 works in 4 States which made other rail joints or fastenings.

Number of Rolling Mills and Steel Works

The number of completed rolling mills and steel works at the close of 1912 was 661, located in 33 States, the District of Columbia, and the Canal Zone, Panama, of which 565 were active during the year and 96 were idle. At the close of 1911 the number of completed works was 647, located in 33 States and the District of Columbia, of which 543 were active and 104 were idle. There was a gain in 1912 over 1911 of 14 completed plants.

The number of works which were equipped with hot trains of rolls at the close of 1912 was 445, of which 373 were active during the year and 72 were idle. At the close of 1911 the number of plants which were equipped with hot trains of rolls was 448, of which 368 were active and 80 were idle.

The number of steel plants which were not equipped with hot trains of rolls at the close of 1912 was 216, of which 192 were active during the year and 24 were idle. At the close of 1911 the number of steel plants not equipped with hot trains of rolls was 199, of which 175 were active and 24 were idle.

In 1912 there were 29 rolling mills and steel plants added to the list of completed works, located in 12 States and the Canal Zone, Panama, of which 8 were equipped with hot trains of rolls and 21 were not, as follows: Rhode Island, 2; New York, New Jersey, 1; Pennsylvania, 5; Texas, 2; Ohio, 2; Indiana, 1; Illinois, 5; Michigan, 4; Iowa, 1; Kansas, 2; Washington, 1; and the Canal Zone, Panama, 1. In 1911 the number of new rolling mills and steel works built was 31.

At the close of 1912 there were 11 rolling mills and steel works in course of erection, of which 7 were being

equipped with hot trains of rolls and 4 were not being equipped, as follows: Pennsylvania, 2; Maryland, 1; Alabama, 1; Ohio, 3; Michigan, 1; Minnesota, 1; and Washington, 2. In addition at the close of 1912 there were plants which were partly erected but upon which work had been temporarily suspended. On December 31, 1912, 7 rolling mills and steel works were being built, of which 7 were being equipped with hot trains of rolls and 0 were not.

During 1912 there were 19 rolling mills and steel works abandoned or dismantled, located in 10 States, of which 12 were equipped with hot trains of rolls and 7 were not, as follows: New York, 3; New Jersey, 1; Pennsylvania, 6; Delaware, 2; Maryland, 1; West Virginia, 1; Alabama, 1; Ohio, 2; Illinois, 1; and Michigan, 1.

Comparative Production of Iron and Steel by Leading Products in 1911 and 1912

The following table compares the production in 1912 of all kinds of pig iron, steel ingots and castings, finished rolled forms of iron and steel, tinplates and terne plates, etc., with the production of similar articles in 1911, the increase or decrease in the output for the two years being shown. Gross tons are used.

Products	1911	1912	Increase or Decrease
Pig iron			
Bessemer and low phos.	9,409,303	11,664,015	2,254,712
Basic.....	8,520,020	11,417,886	2,897,866
Foundry and ferro-silicon	4,468,940	5,073,873	604,933
Malleable Bessemer.....	612,533	825,643	213,110
Forge.....	408,841	469,183	60,342
Spiegeleisen.....	110,236	96,346	*13,890
Ferro-manganese.....	74,482	125,378	50,896
White, mottled, ferro-tit, etc.....	45,192	54,613	9,421
Total pig iron, gross tons.....	23,649,547	29,726,937	6,077,390
Steel ingots and castings			
Open-hearth.....	15,598,650	20,780,723	5,182,073
Bessemer.....	7,947,854	10,327,901	2,380,047
Crucible.....	97,653	121,517	23,864
Electric and all other steel.....	31,949	21,162	*10,787
Total steel, gross tons	23,676,106	31,251,303	7,575,197
Rolled iron and steel			
Rails.....	2,822,790	3,327,915	505,125
Plates and sheets.....	4,488,049	5,875,080	1,387,031
Nail and spike plate.....	48,522	45,331	*3,191
Wire rods.....	2,450,453	2,653,553	203,100
Structural shapes.....	1,912,367	2,846,487	934,120
Merchant bars.....	3,047,362	3,697,114	649,752
Bars for concrete work..	258,741	274,332	15,591
Skelp, flue, etc.....	1,980,673	2,446,816	466,143
Long angle splice bars, etc.....	†.....	571,772	.....
Hoops.....	225,074	270,007	44,933
Rands and cotton-ties...	342,810	587,395	244,585
Sheet piling.....	22,827	22,276	*551
Railroad ties.....	39,197	41,396	2,199
All other finished rolled and billets, etc.....	1,169,191	1,187,178	17,987
Exports blooms, billets, etc.....	†.....	347,783	.....
Total, gross tons.....	19,039,171	24,656,841	5,617,670
Miscellaneous products			
Tin and terne plates, lb..	1,756,070,000	2,157,055,000	400,985,000
Fin. ang. splice bars, etc., g.t.....	†.....	502,771	.....
Cut nails—kegs.....	967,636	978,415	10,779
Wire nails—kegs.....	13,437,778	14,659,700	1,221,922
Ham. char. blooms, gross tons.....	64,616	65,807	1,191

*Decrease. †Statistics not collected from the manufacturers in 1911.

Forged Iron and Steel

The production of forged iron and steel axles, shafting, anchors, armor plate, gun carriages, etc., by rolling mills and steel works from 1906 to 1912 was as follows in gross tons:

Years	Iron	Steel	Total	Years	Iron	Steel	Total
1906..	19,148	333,488	352,636	1910..	20,410	299,452	319,862
1907..	23,772	357,033	380,805	1911..	4,034	214,202	218,236
1908..	13,646	117,497	131,143	1912..	9,155	383,365	392,520
1909..	25,523	223,741	249,264	.....	.....	.....	.....

Hammered Charcoal Blooms, Billets, etc.

The production of hammered iron blooms, billets, slabs, bars in charcoal bloomaries from pig iron or from pig and scrap, for the consumption of the makers or for amounting in 1912 to 65,807 gross tons, against 64,616 in 1911, 75,974 tons in 1910, 56,365 tons in 1909, 55,973 in 1908, 84,623 tons in 1907, and 94,999 tons in 1906. The hammered charcoal iron blooms, billets, slabs, bars, produced in 1912 were made in Massachusetts, Pennsylvania, Maryland, Kentucky and Ohio. The number of active plants in 1912 was 12, against 13 in 1911. In 1912 there were 8 idle bloomaries, against 10 in 1911. Pennsylvania made nearly 74.9 per cent. of the total in 1912, against over 81.9 per cent. in 1911 and over 76.3 per cent. in 1910.

Contract for 30,000-kw. Steam Turbo-Generators

A contract for three steam turbo-generating units of no less than 30,000 kw. capacity each for additional requirements of the New York subway extensions was given on August 6 to the Westinghouse Machine Company. Aside from the enormous capacity of the units there are a number of unusual features surrounding the contract. For example, it was decided by H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company, that three general considerations must be satisfied in awarding the contract, and these were reliability, efficiency and cost, considered in the order named. It is stated that the Westinghouse Machine Company won on all three points. As regards reliability, the engineering department of the transit company studied the designs and checked for the stresses likely to be set up in different parts of the unit, and also checked up calculations for the efficiency of the unit.

The design of each unit is also of interest, as it will consist practically of two separate machines, one with a high-pressure steam turbine taking the boiler steam and the other a low-pressure turbine taking the steam from the high-pressure portion of the unit. This provides for a wide range of pressure with less difficulty on account of high peripheral velocity, and therefore large diameters of the unit, and each of the two parts of the single unit will run at a different speed. The speed of the high-pressure part is 1,500 r.p.m., and that of the low-pressure part 750 r.p.m., and the output of the two parts will be about equal. The velocity of the rotary element of the low-pressure turbine will be 480 ft. per second, or nearly $5\frac{1}{2}$ miles per minute. At a speed of 750 r.p.m., this shows that the diameter of the low-pressure turbine will be about 12 ft. as a maximum.

Each 30,000-kw. unit will take up a floor space about 40 ft. and will be about 12 ft. high above the floor, the interesting detail in this connection is that the turbine units will replace present machinery and give the greatly increased power output required without necessitating a new building. For condensing purposes there will be two 30,000 gal. per minute pumps, probably turbine-driven centrifugal pumps, together with a dry vacuum pump and a condensing surface of about 45,000 sq. ft. The first turbine is to be delivered by June 1, 1914, and the others are to be delivered at intervals of six weeks or two months.

The Metal Schedule in the Senate

WASHINGTON, D. C., August 12, 1913.—After nearly 10 days' debate on the metal schedule of the Underwood-Simmons bill in the United States Senate, not a single change has been made in the schedule as reported in the Senate and published in *The Iron Age*, and the indications are that no change will be made. By a decisive vote yesterday cast-iron pipe of all kinds was retained on the free list. Several items in the metal schedule were passed in order to permit Senators to speak upon them, and it is now the expectation that the schedule will finally be passed this week. Of course, on the final passage of the bill, votes on different items and schedules will be taken for record purposes. Altogether it appears that the majority have so far carried out their announcement of putting the bill through without a single amendment not approved by the caucus and the majority of the Finance Committee. W. L. C.

The Steel Corporation's Unfilled Orders

The statement of the United States Steel Corporation, issued August 9, shows that the total of unfilled orders on the books of its subsidiaries July 31 was 5,399,356 tons, a decrease in the month of 407,961 tons. The decrease has been continuous since December 31, when the total was 7,932,164 tons. The loss in seven months is thus 2,532,808 tons. The table below gives the unfilled tonnage for each month back to December 30, 1910, and previous to that for the end of each year:

July 31, 1913.....	5,399,356	November 30, 1911.....	4,141,955
June 30, 1913.....	5,807,317	October 31, 1911.....	3,694,328
May 31, 1913.....	6,324,322	September 30, 1911.....	3,611,317
April 30, 1913.....	6,998,762	August 31, 1911.....	3,584,085
March 31, 1913.....	7,468,956	July 31, 1911.....	3,695,985
February 28, 1913.....	7,656,714	June 30, 1911.....	3,361,058
January 31, 1913.....	7,827,368	May 31, 1911.....	3,113,187
December 31, 1912.....	7,932,164	April 30, 1911.....	3,218,704
November 30, 1912.....	7,852,883	March 31, 1911.....	3,447,301
October 31, 1912.....	7,594,381	February 28, 1911.....	3,400,543
September 30, 1912.....	6,551,507	January 31, 1911.....	3,110,919
August 31, 1912.....	6,163,375	December 31, 1910.....	2,674,757
July 31, 1912.....	5,957,079	December 31, 1909.....	5,927,031
June 30, 1912.....	5,807,346	December 31, 1908.....	3,603,527
May 31, 1912.....	5,750,983	December 31, 1907.....	4,624,552
April 30, 1912.....	5,664,885	December 31, 1906.....	8,489,719
March 31, 1912.....	5,304,841	December 31, 1905.....	7,605,086
February 29, 1912.....	5,454,200	December 31, 1904.....	4,696,203
January 31, 1912.....	5,379,721	December 31, 1903.....	3,215,123
December 31, 1911.....	5,084,761	December 31, 1902.....	5,347,523

Not since the March 31, 1912, statement has so small a total been shown as that of the present statement.

July Copper Production and Stock

The monthly report of the Copper Producers' Association shows the stock of copper on hand at the end of July to have been 53,594,945 lb., an increase of only 690,339 lb. over that at the end of June. Domestic consumption fell off nearly 10,000,000 lb., while foreign consumption increased over 10,000,000 lb. The July statement of the association compares as follows with that of the previous month:

	June, pounds	July, pounds
Stock of marketable copper of all kinds on hand at all points in the United States at first of month.....	52,904,606	67,564,225
Production of marketable copper in the United States from all domestic and foreign sources in the month.....	138,074,602	121,860,853
Deliveries of marketable copper in the month:		
For domestic consumption.....	59,904,192	68,452,571
For export.....	78,480,071	68,067,901
Total deliveries.....	137,384,263	136,520,472
Stock of marketable copper of all kinds on hand at all points in the United States, at the close of the month.....	53,594,945	52,904,606

The slight change in the stock on hand is due to the fact that production and total consumption nearly kept pace with each other. The trade had expected that stock figures would show an increase of nearly 10,000,000 lb. over that of June. The stock on hand January 31 was 123,198,382 lb., which shows how supplies have dwindled.

The Standard Steel Company's Affairs

President James Bowron is quoted as saying that if the present plans go through, the reorganization of the Standard Steel Company will be effective after September 1. The new company is to be known as the Gulf States Steel Company and its capitalization will be \$15,000,000. It is planned to raise \$1,980,000 to pay off the amount named for the properties in the Federal Court proceedings and to provide for such improvements as will be necessary to put the new company on a paying basis. The improvements are estimated to require \$324,000 and include changes in open-hearth and blooming-mill departments, new stokers, new machine shop, field fence machines, bar-mill changes, new dwellings and the development of a new coal mine at Altoona, Ala.

Birmingham advices state that a deal was closed August 5 by which the company has secured 1600 acres of self-fluxing red ore properties from the Birmingham Self-Fluxing Ore Company, near Birmingham, and will continue the ore developments already started. The purchase price is said to have been from \$500,000 to \$750,000. It is estimated that the properties carry about 200,000,000 tons of ore from two veins of a total thickness of 20 ft., averaging 40 per cent. metallic iron.

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Iron and Steel Exports at New High Values

In the fiscal year just ended iron and steel exports comprised a larger proportion of the total exports than in any previous year, and this despite the fact that the total exports were by far the largest on record. Comparison of the past three years is made below:

Fiscal years	Total	Iron and steel	Per cent iron and steel
1911.....	\$2,049,320,199	\$222,700,724	10.9
1912.....	2,204,322,409	259,709,399	12.2
1913.....	2,465,884,149	304,605,797	12.4

Between 35 and 40 per cent. of the exports classed as iron and steel are the regular items reported in tonnage including scrap, pig iron, unfinished steel, finished rolled steel, structural material, pipes and tubes, nails, etc., the remainder being hardware, cutlery, machinery, etc. The Government, however, does not include agricultural implements, a very large item, under iron and steel, and lately it has removed electrical apparatus from the category. Thus by a more liberal interpretation our "iron and steel exports" might be made to appear still larger; but when they comprise one-eighth of the exports of what was considered an agricultural nation less than a generation ago, it must be admitted that a wonderful development has occurred.

The figures become a commentary on some utterances from high official sources to the effect that our manufacturers have been very remiss in the development of trade in world markets. At the same time the Department of Commerce has not been slow in the past five months in pointing out the splendid proportions of our export trade from month to month. And there is no claim, we believe, that the enterprise of our manufacturers has been specially stimulated by any Government procedure set in motion since March, or that there have been any fresh discoveries of important channels of consumption. The export showing for the past fiscal year in iron and steel is simply the fruit of the persistent and intelligent cultivation of foreign markets, in season and out of season, and by the same methods that have brought the industry to its towering position at home. Something has been gained in the recognition now given in high quarters to facts with which our manufacturers have been familiar for a long time. Perhaps official utterances on the mistakes of American manufacturers will be tempered by the new education that has been under way since the assumption of office.

Our Pig Iron Capacity Disclosed

At times when the iron market is inactive the public is treated with statements regarding the country's total pig iron capacity, which statements are very frequently misconceptions of physical facts. The physical existence of stacks is known and it is improperly assumed that they could under reasonable conditions contribute to the make. At all times there is a large number of furnaces which are in physical but, if the term be admitted, not in commercial existence. When the iron market is inactive it is not possible to prove the non-existence, from a commercial standpoint, of all such furnaces, and it remains for periods like that of the past six months to furnish an accurate index to our real commercial capacity.

The production of pig iron in the first six months of this year has been officially reported at 16,488,600

tons, which constitutes a gain of 833,939 tons over the best previous record, made in the second half of last year. Production during the period was fairly uniform, our monthly returns of coke and anthracite furnaces showing that the extreme variations from the average were an excess of 2.3 per cent. in February and a deficiency from the average of 3 per cent. in June. Such small divergences might, indeed, be attributed solely to weather conditions. Thus the half year was one of quite steady production.

The official statistics gathered show that a total of 100 furnaces contributed to the make, the average period in blast being 163.3 days, or 90 per cent. of the whole period. This is a defection from absolutely continuous operation not much greater than is expected of a furnace, from the necessity of relining and making other repairs. It is an average equivalent to a furnace being 110 days every three years, which can hardly be regarded as a very excessive allowance. To arrive at a statement of our full capacity, from the actual performance during the six months, it is necessary to make allowance for furnaces which were inactive during the period, but which should properly be included in the estimate of our commercial capacity. Where shall such furnaces be found? Hardly among the regular ranks of the steel-producing interests, for the steel interests operated practically their entire productive force. Some had, it is true, a few detached furnaces that were idle, but the very fact that they were not operated tends strongly to discredit the idea that they could be included in an ordinary commercial reckoning.

As to merchant furnaces, the fact is that the pig iron market advanced approximately \$4 a ton, on an average, in the twelvemonth immediately preceding the period under review. If there were idle furnaces that could properly be included in the reckoning, why did they not get into blast and forestall a portion of this advance? Perhaps a partial answer to this question could be given, but another observation is to be made, that in a period in which the steel works were given full employment more pig iron than actually was made by the merchant furnaces was not required. Certain steel works have made themselves less dependent upon the merchant market than formerly, and their withdrawal is presumably permanent as regular buyers. If the foundry trade only required a certain tonnage of pig iron in this period in which the steel works were fully employed, it is hardly reasonable to conclude that at another time the foundries will take a larger proportion. The total of foundry iron, blast furnace, ferro-silicon and malleable Bessemer irons produced in the first half of this year was 3,337,447 tons. This is at a fairly rate of 6,674,894 tons. The nearest approaches to such a total of these irons were 6,071,499 tons in 1907, 5,980,463 tons in 1909, 6,103,570 tons in 1910 and 5,995,516 tons in 1912.

It does not seem fair to assume that the merchant furnaces can find a market, under ordinarily good commercial conditions, for much more iron than they made during the first half of this year. To give them a much larger market the whole country needs to grow, furnishing steel requirements greater than the steel works are able to meet at this time.

Doubling the production in the first half of this year gives 33,000,000 tons, and an allowance of 1,000,000 tons seems sufficient to give us a commercial capacity of about 34,000,000 tons. Even including furnaces

lately completed or being built our prospective capacity can hardly be taken at more than 35,000,000 tons.

Apart from the furnaces involved in this 35,000,000 tons capacity there are many stacks which under exceptional conditions could be operated. What are those circumstances? Full employment of capacity always involves relatively high prices for raw materials and difficulty in getting together an organization, so that a very substantial increase in selling prices is necessary. Given a furnace which can come out even when the pig iron market is \$14, and another furnace whose theoretical cost, based on similar conditions, is \$16, the second furnace will not usually become a factor even if the market advances to \$17, for while the pig iron advances \$3 the cost of production will also increase. There has been a change in the alignment in the past few years. The building of blast furnaces has been greater than the increase in the supply of raw materials. Lake Superior ore interests, for instance, have built blast furnaces without correspondingly developing ore properties. Thus some of them consume ore which formerly they sold.

The relatively slow growth in our productive capacity in the past few years is emphasized by these conclusions. Assuming a possible production of pig iron in 1914 of 35,000,000 tons, there is an increase of only 50 to 60 per cent. in ten years, whereas in the past pig iron production has doubled once a decade on an average. In 1910 the capacity was approximately 31,000,000 tons, the actual production in the twelvemonth ended June 30, 1910, having been almost 30,000,000 tons, so that in four years from 1910 to 1914 there is shown only 13 per cent. increase.

Thus a very great decrease has occurred in our rate of growth in productive capacity. In the past, demand and capacity grew together. Are the legitimate consumptive requirements and the regular commercial productive capacity now in harmony by both having suffered a great decrease in the rate of expansion, or have the requirements been expanding at something like the old rate, being simply held in abeyance for a time by untoward financial conditions?

Workmen's Compensation as Between States

The Industrial Accident Board of Massachusetts has ruled that "a Massachusetts employee making his contract in Massachusetts with a Massachusetts corporation, and covered by the Workmen's Compensation Act, is entitled to compensation under the act, although injured outside of the Commonwealth of Massachusetts." The decision has been contested, and the case is now awaiting the decision of the supreme court.

The precedent established by the decision will be of great importance, not only in Massachusetts, but in every State where workmen's compensation exists. Under employer's liability the practice has become almost universal that the law of the State in which the accident occurs shall prevail, though suit may be brought wherever service upon the defendant can be had.

For illustration, we will assume that a Massachusetts builder of machinery who has accepted the compensation act sends a workman into the State of New York to repair a machine in the works of a customer, and the man is injured while engaged in the task. New York now has no compensation act.

Under compensation laws it makes no difference whether or not the blame of an accident rests with the workman who is hurt, and, if in a case such as this he can recover, under the laws of his own State no question exists as to the liability of his employer. But, if it is decided that the law of the place where the accident occurs must be appealed to, then in New York action must be taken under the employers' liability act of that State. Should the accident occur because of the negligence of the injured man himself or of a fellow workman, he would have no redress. If his cause were sound, however, the limit of damages under workmen's compensation would be removed and the amount of redress left to the decision of judge and jury. Or, if the workman sent from Massachusetts went into New Jersey, where compensation has been adopted, and is injured there, would he recover under the New Jersey or the Massachusetts act or under employers' liability?

Another of the various questions raised is, what would be the proper legal procedure were the workman injured in his home state of Massachusetts or in New York, while en route from the home works to the plant to which he was ordered? Should the railroad company be to blame, no doubt exists that it would be liable for the damages and the employer would be rid of responsibility. But if the accident resulted from the man's own negligence, if he were disobeying the rules of the railroad, would the employer be compelled to pay compensation? The important question of the liability of the employer for the injuries of those who travel for him regularly is involved.

These problems must be solved in the various States, and decisions are looked forward to by lawyers with keen interest. Up to the present little light has been shed on the subject. The chaotic condition which has been created is regarded with some apprehension. No lawyer who has specialized on the subject pretends to know much about it. Everything depends upon what the courts decide.

One suggestion is that the federal government create a compensation act, applying throughout the country, as is the case in European countries; but this could be accomplished only by a constitutional amendment. Employers' liability is so closely identical in its operation in the several States of the Union that a standard practice has been made possible. Much more involved is the problem of properly applying State compensation laws, differing more or less widely in their details, especially since some States have failed altogether to accept the principle.

Correspondence

The Deutschlandreise of the American Society of Mechanical Engineers

To the Editor: Apropos of the tour of the American Society of Mechanical Engineers through Germany this summer as guests of the Verein Deutscher Ingenieure, I think it can safely be said that among things which struck us most forcibly were the general air of thrift and prosperity noticeable everywhere we went, the cleanliness of the streets, the excellent condition of buildings—mighty few shabby tumbledown ones to be seen—the general cultivation of flowers, the abundance of well-kept parks, the hand-

some and well-arranged office buildings of the industrial plants and the cleanliness and good order in which the grounds and buildings of these plants were kept.

It was evident, too, that industrial welfare is now being widely practiced, partly doubtless due to legislation on the subject, but no doubt with a genuine desire on the part of manufacturers to better the condition of their workmen and workwomen and show them how to expend their wages to best advantage. At one large establishment I noticed a series of rooms furnished complete in simple and useful manner with the price of each article plainly shown. Genuine cooperative stores are conducted by some at least of the larger concerns. Bath and toilet rooms, gymnasiums, entertainment halls and dining rooms are provided. While paternalism doubtless does flourish to a degree much disliked by many workmen, it seemed to me there was a genuine desire upon the part of the employers to reduce this to a minimum. For instance, in one plant is an extensive dining room for the men where they can bring their own lunches and eat them without cost or can buy a plate of soup for 15 pfennigs (about 3½ cents) or a light lunch at twice this or a full lunch of meat and one vegetable for 50 pfennigs; and there is absolutely no compulsion, direct or indirect about it. At the cooperative stores the men are free to buy or not as they please and I believe share in the management as well as in the profits.

Apprentices are apparently carefully looked after. In one plant employing 4500 to 5000 men there were about 400 apprentices with one foreman to every 30 boys. The boys start at 14 years of age and work four years, being paid wages of 13 cents to 30 cents per day and have school instruction at certain times, usually evenings, though in working hours in some cases. I was curious as to the effect of the military service in the organization of these plants, wondering whether the education of the apprentice would not be neutralized to a great extent by his going at once or very soon into the military service for two or three years. Apparently this matter does not worry the manufacturer; possibly a skilled mechanic is exempt from military service or can be excused in some way except under extreme conditions.

As a general proposition it can be safely said that our German friends are right up to date in utilizing modern machinery and are as quick as anybody can be to discard machinery and appliances for new ones where saving in fuel and labor can be shown. True to their disposition generally they apparently do not change without the most painstaking investigation into costs, and if in some plants the most up-to-date machinery was associated with some appliances that seemed to require the services of an unusual number of laborers, doubtless the low wages of common labor accounted for it.

Germany is to be congratulated upon the wonderful development of her water-borne traffic. Witness the magnificent inland harbors we were shown through, such as Hamburg, Duisburg and Ruhrort and the large number of vessels of all kinds noticeable in these harbors and on the rivers. The Germans very evidently take the greatest pains to extend their business with foreign countries and do it by providing their own ships, finding out what the foreigner wants and how he wants it, and printing labels and circulars in whatever language he uses. It may be that the article is cheaply made, but it evidently meets the requirements of the user, particularly his purchasing power, but if he wants the highest grade article that can be made, he can get that too. It may be that the manufacturer has to turn out various articles in comparatively small numbers of one size or design at a time and change these sizes and designs frequently to accommodate his customers, but he is evidently doing it to his own profit and to the profit of the carrying trade, or why these evidences of very material prosperity in both the manufacturing and the shipping industries? May there not be an extremely valuable lesson in all this for us?

The banquets to which we were treated were wonderfully interesting for their variety, for the exceedingly interesting history of the halls, for the unique entertainments provided with them, but above all for the very evident whole-souled unaffected hospitality and cordiality shown everywhere. Our German hosts certainly did their very utmost to make us feel thoroughly at home in every way and there was not the slightest effort to hide anything from us or restrict us in our investigations, except the

the necessity of getting through in time to enjoy a big and, wonderfully good everywhere, with its accompanying entertainment.

Early Use of the Microscope at Iron and Steel Works

To the Editor: In *The Iron Age* of June 5, page 1370, an article on "The Microscope in the Iron and Steel Industry," Albert Sauveur says: "To the best of my knowledge of Henry M. Howe was then the only American devoting time to the microscopical examination of iron and steel." It would not in the least diminish the credit due to Professor Howe for his eminent work on iron and steel; but whenever the history of the investigation of the qualities and structure of iron and steel by means of the microscope is written, mention should be made of Mr. Roepper of the Cambria Steel Works, and Lynwood Garrison of Philadelphia, both of whom used the microscope for the practical examination of the structure of iron and steel in the early eighties, as did also the writer.

To the best of my knowledge, Mr. Roepper used the microscope as early as 1880 although he never gave his findings to the public, being satisfied to keep the practical results of his work for himself. Mr. Garrison was a mining engineer and for many years a leading member of the Franklin Institute of Philadelphia where the writer made his acquaintance. Mr. Garrison had studied and traveled in England, Sweden and Germany and was acquainted with the earlier microscopic work of both Sorby and Martens.

THE PENNSYLVANIA RAILROAD'S USE OF PHOTOMICROGRAPHS

As early as 1884 the writer furnished pieces of various metals, with the permission of his superior in the testing department of the Pennsylvania Railroad, to Mr. Garrison for use in his microscopic investigations; and the writer himself went to the home of Mr. Garrison to observe the working of his photographic outfit, one of the first, if not the first, used in this country for the purpose of taking photomicrographs. At his urgent request the writer was furnished with a microscope by the engineer of tests of the Pennsylvania Railroad in 1883. It was one of Martens' invention, of the ball joint type and was imported, costing \$15. The writer used it for many years and found it a great help in his work of examining fractures, calling the attention of steel men and engineers to the value of the microscope as an auxiliary.

But while this early practical work with the microscope, by both Mr. Roepper and the writer, may be considered by some as not being performed by Americans, both being German born, it is a matter of record that Mr. Garrison, an American-born citizen, not only used a microscope but a photographic apparatus, and gave public lectures upon the subject several years before Professor Howe published his classic treatise on "The Metallurgy of Steel" in 1890. In it Professor Howe freely mentions the work of Sorby and Martens, but does not mention Garrison. Nor does he give any direct account of his own work with the microscope, whatever he may have done, but uses Sorby's illustrations and freely quotes from a lecture by Sorby on "The Microscopic Structure of Iron and Steel," delivered at the meeting of the Iron and Steel Institute in 1885.

The *Charcoal Iron Worker*, No. 2, page 68, contains an account of a lecture on "The Microscopic Structure of Car Wheel Iron," delivered by F. Lynwood Garrison, at the annual meeting of the American Institute of Mining Engineers in 1886. No. 3 of the same journal contains an account of the annual meeting of the Charcoal Iron Workers' Association at Philadelphia, November, 1886, when a paper was read, sent by Wedding from Berlin, on "The Difference in the Microscopical Structure of Charcoal and Coke Iron." In the discussion of that paper Mr. Garrison explained certain features of the illustrations and called attention to the difference between Wedding's illustrations and his own illustrations of the same subject, Wedding's being hand drawn, while Garrison's were photomicrographs, showing that Garrison was ahead even of Wedding in that respect and thereby proved his priority.

In December, 1886, Mr. Garrison delivered a lecture at the Franklin Institute on "The Microscopic Structure of Iron and Steel," showing photomicrographs of iron, steel and steel rails, also showing his photographic outfit and

giving directions for preparing pieces. This was the first public information of the kind given in this country by an American up to 1886, so far as the writer knows. And while the writer does not deserve any credit for performing public work like that of Mr. Garrison, nevertheless, beginning with 1883, he urged upon steel makers and engineers in season and out of season the use of the microscope as an auxiliary to physical testing; yet it was early emphasized that the microscope should not be considered anything else but an auxiliary. But Mr. Garrison should not be forgotten as the earliest American-born investigator to disseminate publicly the value of the microscope in practical metallurgy.

CAMBRIA STEEL COMPANY ALSO A PIONEER

When Mr. Garrison drifted into other business, the writer induced J. Fronheiser, then manager of furnaces of the Cambria Steel Company, to buy Garrison's microscopic outfit, and the Cambria Steel Company was the first steel works of any size in the country to use a microscope in its test department. This was before the Johnstown flood of 1889. The writer saw letters from Dr. Martens to Mr. Garrison, commenting favorably upon his work, and when in 1893 the German government sent Dr. Martens to the Columbia Exposition at Chicago, the writer had the pleasure of taking him on a visit to the Cambria Steel Works, where he saw Garrison's former photographing outfit and suggested some improvements in its use.

Incidentally, as a contribution to the early history of the use of the microscope in examining iron and steel in this country, the writer may mention the fact of his corresponding with Dr. Martens on the use of the microscope in the testing laboratory of the Pennsylvania Railroad, beginning with 1883, and as a consequence of this correspondence the Prussian government appointed the writer a corresponding member of the Royal Prussian Bureau of Testing (Koenigliches Materialpruefungsamt). Thus, without in the least infringing upon the value of whatever Professor Howe may have done along that line, Mr. Garrison's public work 27 years ago and the recognition by the Prussian government, also 27 years ago, of similar work with the microscope in the testing laboratory of the Pennsylvania Railroad, were at least co-existent with whatever was done by others during the early 80s.

More than 30 years ago, during the experimental use of steel axles, the writer noticed certain structural defects in some and not in others, and with the help of the microscope he was able to trace these defects to improper furnace work. Thus the Pennsylvania Railroad testing laboratory was the first commercial agency to contribute its share toward progress in steel production by means of the microscope.

PAUL KREUZPOINTNER.

ALTOONA, PA., August 4, 1913.

Freight Rates on Structural Shapes and Pig Iron

WASHINGTON, D. C., August 12, 1913.—Notice has been given the Interstate Commerce Commission by the Louisville & Nashville Railroad and other Southern carriers that they will withdraw their proposed change of classification of iron and steel bridge material and allow present rates to remain. The carriers transferred bridge and bridge material from class N to class I because it was claimed that it was found that in numerous instances structural iron (class I) was being transported as bridge material, etc. The effect of the change to class I would have been to increase the rate on bridge material in some instances as much as 100 per cent. On complaint of the Memphis Freight Bureau, the Traffic Bureau of Knoxville, and others, the commission had suspended the proposed change pending its investigation, and now the carriers voluntarily withdraw the proposed change, leaving present rates.

The commission has granted authority to establish rates on pig iron from Bristol, Tennessee-Virginia, to New Albany, Ind., and from Allen's Creek, Goodrich and South Pittsburg, Tenn., to New Albany and Jeffersonville, Ind., made 25c. per ton of 2240 lb. higher than the rates concurrently in effect from the same points of origin to Louisville, Ky., without observing the long and short haul provision of the fourth section of the act to regulate commerce.

W. L. C.

The Iron and Metal Markets

Wire and Pipe Prices Lower

August Buying Below the July Rate

Sheets Weaker and Ferromanganese Is Reduced —Basic Pig Iron Still at \$14

Reductions announced this week in prices of wire products and butt weld pipe are more definite recognition by manufacturers of the tendency in all finished steel lines. Sheets are also lower. In primary products the chief change is a formal reduction of \$2.50 a ton by the foreign makers of ferro-manganese.

From the level to which the \$1 a ton advance of March 19 carried wire prices the reduction of this week is \$3, but in fact the new prices are \$1 a ton lower than those prevailing for a good many weeks, making wire nails \$1.65, Pittsburgh, and plain wire \$1.45. It is evident that the wire market is influenced by conditions affecting all lines and the response to the new prices is not pronounced as yet, though in some directions demand is better.

The demand for lap weld pipe has for months been exceptional, but in the butt weld product competition has been more marked, so that on some sizes the new prices of the leading producer really meet recent cutting.

It is to be noted that as the accumulation of business on steel manufacturers' books grows less, there is not an accelerated rate of decrease. In the case of the Steel Corporation the reduction of 408,000 tons in July compares with 517,000 tons in June and 654,000 tons in May. Wear and tear and the scheduled requirements of manufacturers who work up rolled iron and steel are bringing to the mills an amount of work indicating that stocks are low in second hands.

The question on which another two months may throw light is the basis of prices on which buying will become freer. There is so much on the books at the full contract prices that have held for the past ten months that important price changes are not likely for some weeks. With the period of lower iron and steel duties near at hand the probable effect of these is having more attention from buyers. The July dip in Continental billets to \$19 Antwerp showed the possibility of laying down duty-free billets at Atlantic port at \$5 a ton below the Philadelphia price of the past few months.

August has brought a slowing down in new business from the July rate, with no advance signs of the fall movement that has been so generally predicted. September will bring some further additions to open-hearth steel production in the Central West, notably at the Edgar Thomson works; yet the sheet bar market has been firm, even with a good many sheet mills making only a 50 per cent. output in July. The steel works evidently had ample outlet for their steel in other lines.

Black sheets have gone slightly below 2.25c. for No. 28 since leading makers decided two weeks ago to meet that price. Galvanized sheets have also shown weakness and 3.25c. is freely quoted. The increase in sheet mill capacity in the face of high prices for steel and only moderate prices for sheets is still a marvel.

Car works have enough work ahead to hold their prices fairly steady under the summer's dearth of orders. The Southern Railway has just placed 1720 cars and the Lehigh Valley has ordered 500 steel underframes. The Northern Pacific is reported to be in the market for 3500 cars, and the Boston & Maine inquiry for 3000 to 4000 cars is apparently revived.

Structural contracts include 2400 tons for the Paul passenger terminal at Spokane, and the American Zinc & Chemical Company is about to place 2000 tons for the first unit of its new plant in Pennsylvania. Bids went in this week on 3500 tons of elevated work for the Brooklyn Rapid Transit, and next week bids will be taken on 9700 tons for the Woodside-Corona extension, routes 36 and 37 of section 1.

The foundry pig iron market has not held up the July rate of buying so far as the large consumers are concerned, but smaller buyers have not been driven by the moderate advances in prices. Steel-making irons, particularly basic, have not established similar advances. In the Central West further sales of basic have been made at \$14 at Valley furnace.

Buffalo reports sales of 27,000 tons of foundry and malleable grades in the past week and some furnaces there are practically sold up to December. One Southern producer has now nearly 100,000 tons on its books. On contracts \$11 at Birmingham is usual though \$10.75 has been done on early delivery iron. In the Eastern market 200-ton buyers have been out in force.

Foreign producers of ferromanganese have made another "announcement" of a \$2.50 reduction, or to \$55 Baltimore. The market had not been waiting for it, however, and \$55 has already been quoted.

A Comparison of Prices

Advances Over the Previous Week in Heavy Types Declines in Italics

At date, one week, one month, and one year previous.

	Aug. 13,	Aug. 6,	July 9,	Aug. 24,
Pig Iron, Per Gross Ton:	1913.	1913.	1913.	1912.
Foundry No. 2 X, Philadelphia.	\$15.50	\$15.50	\$15.75	\$15.75
Foundry No. 2, Valley furnace.	14.00	14.00	14.00	14.00
Foundry No. 2 S'th'n, Cin'ti.	14.00	14.00	13.75	15.00
Foundry No. 2, Birmingham, Ala.	10.75	10.75	10.50	11.75
Foundry No. 2, furnace, Chicago*	15.00	15.00	14.75	15.50
Basic, delivered, eastern Pa.	15.25	15.25	15.50	15.75
Basic, Valley furnace.	14.00	14.25	14.50	14.00
Bessemer, Pittsburgh	16.40	16.40	16.90	15.40
Malleable Bessemer, Chicago*	15.00	15.00	14.50	15.50
Gray forge, Pittsburgh	14.25	14.25	14.65	14.15
Lake Superior charcoal, Chicago	14.50	14.50	15.75	16.25

Billets, etc., Per Gross Ton:	27.00	27.00	26.50	22.00
Bessemer billets, Pittsburgh...	27.00	27.00	26.50	22.50
Open hearth billets, Pittsburgh.	27.50	27.50	27.00	23.00
Open hearth sheet bars, Pgh.	34.00	34.00	34.00	29.00
Forging billets, Pittsburgh...	28.00	28.00	28.00	24.40
Open hearth billets, Philadelphia	28.00	28.00	28.50	25.50
Wire rods, Pittsburgh	28.00	28.00	28.50	25.50

Old Material, Per Gross Ton:	14.00	14.00	14.00	16.00
Iron rails, Chicago	17.50	17.50	17.50	16.50
Iron rails, Philadelphia	12.75	12.75	13.00	13.50
Carwheels, Chicago	12.50	12.50	13.00	14.00
Carwheels, Philadelphia	12.50	12.50	12.50	13.50
Heavy steel scrap, Pittsburgh...	10.75	10.50	10.50	12.00
Heavy steel scrap, Chicago...	11.50	11.25	11.50	12.75
Heavy steel scrap, Philadelphia				

Finished Iron and Steel,	Cents.	Cents.	Cents.	Cents.
Per Pound to Large Buyers:				
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.42½	1.42½	1.47½	1.37½
Iron bars, Pittsburgh	1.60	1.65	1.65	1.40
Iron bars, Chicago	1.45	1.45	1.50	1.40
Steel bars, Pittsburgh	1.40	1.40	1.40	1.40
Steel bars, New York	1.56	1.56	1.56	1.46
Tank plates, Pittsburgh...	1.45	1.45	1.45	1.51
Tank plates, New York	1.61	1.61	1.61	1.51
Beams, Pittsburgh	1.45	1.45	1.45	1.35
Beams, New York	1.61	1.61	1.61	1.51
Angles, Pittsburgh	1.45	1.45	1.45	1.35
Angles, New York	1.61	1.61	1.61	1.51
Skelp, grooved steel, Pittsburgh	1.45	1.45	1.45	1.35
Skelp, sheared steel, Pittsburgh	1.50	1.50	1.50	1.40
Steel hoops, Pittsburgh	1.50	1.60	1.60	1.40

Sheets, Nails and Wire,				
Per Pound to Large Buyers:				
Sheets, black, No. 28, Pittsburgh	2.25	2.25	2.25	2.00
Wire nails, Pittsburgh	1.65	1.70	1.70	1.65
Cut nails, f.o.b. Eastern mills	1.75	1.75	1.80	1.70
Cut nails, Pittsburgh	1.60	1.60	1.70	1.60
Fence wire, ann'l'd. 0 to 9, Pgh.	1.45	1.55	1.55	1.45
Barb wire, galv., Pittsburgh	2.05	2.20	2.20	1.95

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	Aug. 13, 1913.	Aug. 6, 1913.	July 9, 1913.	Aug. 14, 1912.
Per Net Ton at Oven:				
House coke, prompt shipment	\$2.50	\$2.50	\$2.50	\$2.15
House coke, future delivery	2.50	2.50	2.50	2.25
Foundry coke, prompt shipment	2.90	2.90	2.75	2.40
Foundry coke, future delivery	3.00	3.00	3.00	2.50

Iron.

Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
House copper, New York	16.00	15.37½	14.75	17.75
Electrolytic copper, New York	15.75	15.12½	14.50	17.62½
Spelter, St. Louis	5.50	5.45	5.25	7.05
Spelter, New York	5.65	5.60	5.40	7.20
Lead, St. Louis	4.40	4.37½	4.20	4.35
Lead, New York	4.50	4.50	4.35	4.50
Antimony, Hallen, New York	41.75	41.50	39.35	45.87½
Antimony, Hallen, New York	7.75	7.75	8.00	7.87½
Antimony, Hallen, New York	\$3.60	\$3.60	\$3.60	\$3.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 19c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific Coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.45c. to 1.50c. base, net cash, 30 days. Following stipulations prescribed by manufacturers, with exceptions:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or not, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.	.10
Gauges under 3-16 in. to and including No. 2.	.15
Gauges under No. 2 to and including No. 9.	.25
Gauges under No. 9 to and including No. 10.	.30
Gauges under No. 10 to and including No. 12.	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.30
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 10 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.45c. to 1.50c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in. on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, \$28 to \$28.50. Fence wire, Nos. 0 to 9, per 100 lb. terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.45; galvanized, \$1.85. Galvanized barb wire, to jobbers, \$2.05; painted, \$1.65. Wire nails, to jobbers, \$1.65.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

No.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	\$1.65	\$1.70	\$1.75	\$1.80	\$1.90	\$2.00	\$2.10	\$2.20
Galvanized	2.10	2.15	2.20	2.30	2.40	2.50	2.60	2.70

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from August 8, 1913, and iron pipe (full weight), from June 2, 1913:

Butt Weld.

Inches.	Steel.	Black.	Galv.	Inches.	Iron.	Black.	Galv.
¾, 1 and 1½	73	52½	52½	¾ and 1	66	47	
1½ to 2	77	66½	66½	1 and 1½	65	46	
2 to 3	80	71½	71½	1½ to 2	69	56	
				2 to 2½	72	61	

Lap Weld.

2	76	67½	1½	56	45
2½ to 6	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52		2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	74	65½	2, butt	70	59
2½ to 6, lap	76	67½	1½, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends.

¾, 1 and 1½	68	57½	¾	63	52
1½ to 2	73	66½	1½	67	60
2 to 3	77	70½	2 to 1½	71	62
	75	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.

2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.

¾	63	56½	¾	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.

2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.	Standard Charcoal Iron.
1¾ and 2 in.	60
2½ in.	57
2½ and 2¾ in.	63
3 and 3½ in.	67
3½ and 4½ in.	69
5 and 6 in.	63
7 to 13 in.	60
1½ in.	44
1¾ and 2 in.	46
2½ in.	44
2½ to 2¾ in.	53
3 and 3½ in.	55
3½ to 4½ in.	58
Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2½ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.	Cents per lb.
Nos. 3 to 8	1.70
Nos. 9 to 10	1.75
Nos. 11 and 12	1.80
Nos. 13 and 14	1.85
Nos. 15 and 16	1.95

Box Annealed Sheets, Cold Rolled.	Cents per lb.
Nos. 10 and 11	1.90
No. 12	1.90
Nos. 13 and 14	1.95
Nos. 15 and 16	2.00
Nos. 17 to 21	2.05
Nos. 22 and 24	2.10
Nos. 25 and 26	2.15
No. 27	2.20
No. 28	2.25
No. 29	2.30
No. 30	2.40

Galvanized Sheets of Black Sheet Gauge.	Cents per lb.
Nos. 10 and 11	2.25 to 2.30
No. 12	2.35 to 2.40
Nos. 13 and 14	2.35 to 2.40
Nos. 15 and 16	2.50 to 2.55
Nos. 17 to 21	2.65 to 2.70
Nos. 22 and 24	2.80 to 2.85
Nos. 25 and 26	2.95 to 3.00
No. 27	3.10 to 3.15
No. 28	3.25 to 3.30
No. 29	3.40 to 3.45
No. 30	3.55 to 3.60

Pittsburgh

PITTSBURGH, PA., August 13, 1913.

It would seem that the downward tendency in prices is now becoming more definite, as during the past week open reductions have been made on three products. Ferromanganese has been reduced \$2.50 a ton, or from \$58.50 to \$56, seaboard; wire products have been reduced \$3 a ton (practically only \$1) and butt-weld pipe 1 point, or \$2 a ton. The market on black and galvanized sheets has also declined to 2.25c. for No. 28 black and 3.25c. for No. 28 galvanized, while it is intimated that in a few cases these prices have been slightly shaded. The heavy sales of pig iron in the past two weeks have not had the expected effect of improving prices, basic and Bessemer iron being still obtainable at the figures at which those sales were made. The new inquiry for steel is quiet, but prices are pretty firmly held, most of the available supply of billets and sheet bars being held by the three leading makers. It is still the expectation that there will be a free buying movement early in September, but it would seem that if such a movement develops it will be to take care of actual consumptive demand only. Mills continue to report that actual specifications against contracts are running from 65 to 70 per cent. of output, and they are steadily gaining on back orders.

Pig Iron.—While the tone of the market may possibly be stronger at least one prominent pig-iron interest is still offering basic iron at \$14, Valley furnace, for delivery over the next two or three months. Several sellers are asking higher prices on both basic and Bessemer, but so far have not made actual sales. The Pittsburgh Steel Company bought last week about 4000 tons of basic iron for August delivery on the basis of \$14, Valley furnace; the Colonial Steel Company bought 1000 tons for August and 500 tons for September at the same price, and the American Steel Foundries bought a pretty heavy tonnage for its Alliance and Sharon works at practically \$14. There is nothing doing in Bessemer iron, and the new inquiry for foundry has also quieted down. There has been some movement in gray forge iron, one local interest having bought 1500 tons at \$13.35, Valley furnace, and another consumer 6000 tons for remainder of the year delivery, at about the same figure. Higher prices on pig iron may come, as the furnaces are said to be well sold up for the next several months. We quote: Bessemer iron, \$15.50; basic, \$14 to \$14.25; malleable Bessemer, \$13.75 to \$14; No. 2 foundry, \$14, and gray forge, \$13.35, all at Valley furnace, the freight rate for delivery in the Pittsburgh or Cleveland district being 90c. a ton.

Steel Billets and Sheet Bars.—The new inquiry is quiet. The supply of Bessemer steel is ample to meet all demands, but a shortage in open-hearth steel still exists; one leading consumer of the latter tried to buy some in the open market for quick delivery without success. We quote Bessemer and open-hearth billets for prompt delivery and also for shipment over remainder of the year at \$27, and Bessemer and open-hearth sheet bars for the same delivery at \$27.50, maker's mill, Pittsburgh or Youngstown. The smaller steel mills that occasionally come in the market shade these prices about 50c. a ton. We quote forging billets at \$34 and axle billets at \$29, maker's mill.

Wire Rods.—There is not much new inquiry, consumers being covered by contracts against which specifications are only fair. We quote Bessemer, open-hearth and chain rods at \$28 to \$28.50, Pittsburgh.

Ferroalloys.—Importers of ferromanganese have again reduced prices \$2.50 a ton, or from \$58.50 to \$56, seaboard. This latter price had been quoted by dealers for several weeks, however, without securing any new business of moment. In fact carload lots for prompt shipment have sold recently at \$55 to \$55.50, seaboard. We quote 80 per cent. ferromanganese for prompt delivery at \$55 to \$55.50 and for forward delivery at \$56, Baltimore, the freight rate to the Pittsburgh district being \$2.16 per ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$75; over 100 tons or 600 tons, \$74; over 600 tons, \$73, Pittsburgh.

Muck Bar.—Three or four important muck-bar mills are still shut down, refusing to pay the Sons of Vulcan scale for puddling. As a result muck bar is scarce and firm. We quote best grades made from all pig iron at \$31 to \$31.50, Pittsburgh.

Skelp.—The new demand is very active, and mills rolling skelp are filled up for several months. A sale of 1000 tons of grooved steel skelp is reported at 1.45c., delivered at buyer's mill. We quote: Grooved steel skelp, 1.45c. to 1.50c.; sheared steel skelp, 1.50c. to 1.55c.;

grooved iron skelp, 1.70c. to 1.75c.; sheared iron skelp, 1.75c. to 1.80c., all delivered to buyers' mills in the Pittsburgh district.

Steel Rails.—No important orders for standard sections were placed the past week, but there have been numerous small orders. The new demand for light rails is active; in the past week the Carnegie Steel Company received new orders and specifications for close to 4000 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—Some car orders have come out and there is a little more new inquiry. The Southern Railway has placed orders for 800 steel gondolas and 500 steel hoppers with the American Car & Foundry Company and 420 steel gondolas with the Mt. Vernon Car & Mfg. Company. The Lehigh Valley has ordered 500 steel underframes from the Standard Steel Car Company and reports are that the Northern Pacific is inquiring for 3500 steel cars and the New York, New Haven & Hartford for 3000 to 4000 cars. The larger plate mills are pretty well filled for the remainder of this year, but some of the smaller mills have very little business on their books, and are offering plates for prompt delivery at 1.45c., Pittsburgh. We quote ¼ in. and heavier plates for prompt or forward delivery at 1.45c., Pittsburgh.

Structural Material.—New inquiry is fairly active, but very little business is being actually placed. The Cambria Steel Company has taken 1500 tons for new buildings for the Pennsylvania Rubber Company, Jeannette, Pa.; the American Bridge Company, 575 tons for highway bridges in Hamilton County, Ohio, and the American Zinc & Chemical Company is about to place 2000 to 3000 tons for the first unit of its new plant to be built at Burgettstown, Pa. We quote beams and channels up to 15 in. at 1.45c. to 1.50c. Small lots from warehouse for prompt delivery are bringing from 1.60c. up, depending on the size of the order and the deliveries wanted.

Iron and Steel Bars.—With the heavy business in steel bars placed in the past two weeks by the implement makers and other large consumers, the leading mills are pretty well filled for the remainder of the year. Specifications are coming in at about 70 per cent. of output. The steel car companies are specifying freely for steel bars, and the implement makers are expected to take more bars in the near future. The new demand for iron bars has fallen off some; the mills, having pretty well caught up on back deliveries, are able to make prompt shipments. There is a decided scarcity of muck bar, which, if it continues, may lead to a shortage in the supply of iron bars, but this has not yet developed. Prices on iron bars continue weak. We quote steel bars for forward delivery at 1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.60c. to 1.70c. The mills continue to charge \$1 extra per ton for twisting ¼ in. and larger steel bars and \$2 extra for ½ to ¾ in.

Sheets.—Some heavy inquiries are reported for black and galvanized sheets, and this is taken by some makers to mean that consumers are getting the idea that prices are probably as low as they will go. It is claimed that with sheet bars at \$27 at maker's mill, a sheet mill that pays this price and sells No. 28 black sheets at 2.25c. cannot do better than come out whole. This week the American Sheet & Tin Plate Company is running to only 68 per cent. of its hot sheet mill capacity, the Scottdale works, which has six mills, being down to allow a new engine to be installed. The open price on No. 28 black sheets is 2.25c. and on No. 28 galvanized 3.25c., but No. 28 black is being sold in some cases at 2.20c., and galvanized at 3.20c. on good orders. We quote No. 10 blue annealed sheets at 1.75c.; No. 28 Bessemer black sheets, 2.25c.; No. 28 galvanized, 3.25c., and No. 28 tin mill black plate, 2.20c. to 2.25c.; and No. 30, 2.25c. to 2.30c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Mills report specifications coming in better, and there is some new inquiry in the market from consumers that had placed orders with mills which are not running full on account of labor troubles. The American Sheet & Tin Plate Company continues to run to about 84 per cent. of capacity. We quote 100-lb. cokes nominally at \$3.60 and 100-lb. ternes at \$3.45, maker's mill, Pittsburgh.

Spikes.—Few new orders are being placed, and specifications from the railroads have been dull for some time. Some spike makers are in need of new business.

We quote railroad spikes in base sizes, $5\frac{1}{2} \times 9/16$ in., at \$1.70 to \$1.75, and small railroad and boat spikes in carload and larger lots at \$1.75 to \$1.80 per 100 lb., f.o.b. Pittsburgh.

Bolts and Rivets.—Discounts on nuts and bolts are more or less nominal, as they are being shaded on good orders. New business is quiet, consumers buying only such quantities as are needed for current wants. Prices on rivets are also being shaded, and new buying is light. We quote button-head structural rivets at \$2 and cone-head boiler rivets at \$2.10 in large lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on bolts are as follows, in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws.....	80 and 10% off
Small carriage bolts, cut threads.....	.75 and 5% off
Small carriage bolts, rolled threads.....	.75 and 10% off
Large carriage bolts.....	.70 and 2½% off
Small machine bolts, cut threads.....	.75 and 10% off
Small machine bolts, rolled threads.....	.75, 10 and 5% off
Large machine bolts.....	.70 and 7½% off
Machine bolts with C.P.C. and T nuts, small.....	.75 and 5% off
Machine bolts with C.P.C. and T nuts, large.....	.70 off
Square hot pressed nuts, blanked and tapped.....	\$.57 off list
Hexagon nuts.....	\$.63 off list
C.F.C. and R. square nuts, tapped and blank.....	\$.57 off list
Hexagon nuts, ¾ and larger.....	\$.66 off list
Hexagon nuts smaller than 9/16.....	\$.72 off list
C.P. plain square nuts.....	\$.52 off list
C.P. plain hexagon nuts.....	\$.55 off list
Semi-finished hexagon nuts, ¾ and larger.....	.85% off
Semi-finished hex. nuts smaller than 9/16.....	.85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter.....	.75, 10 and 10% off
Rivets, metallic tinned, bulk.....	3½c. per lb. net extra
Rivets, tin plated, bulk.....	1½c. per lb. net extra
Rivets, metallic tinned, packages.....	.70, 10 and 10% off
Standard cap screws.....	.75, 10, 10 and 7½% off
Standard set screws.....	.75, 10, 10 and 7½% off

Wire Products.—The irregularity which has existed for some time in prices on wire and wire nails has resulted in an open reduction by all the mills, which became effective late last week. This puts the price of wire nails to jobbers at \$1.65; plain annealed wire, \$1.45; galvanized barb wire, \$2.05, and painted barb wire, \$1.65, f.o.b. Pittsburgh, per 100 lb., usual terms, actual freight added to point of delivery. The manufacturers believe that this heavy reduction in prices, thus putting the market on a definite basis, will result in more new business and freer specifications against contracts than has been the case for some time. The usual advances over the above prices are charged for small lots from store. We also note that on all shipments of wire nails and wire made since August 1, on which prices were higher than given above, the makers will adjust the prices to correspond with those noted above.

Shafting.—The demand is only for small lots to meet current needs. Specifications against contracts are fair, but there is no betterment in prices. Regular discounts on cold rolled shafting are 60 off in carload lots and 55 in small lots, but on good orders 62 off is being freely quoted.

Hoops and Bands.—Little new business is being placed, as most consumers are covered by contracts, against which specifications are only fair. For some time the output of hoops and bands has been in excess of incoming business, and the mills are catching up on back orders. The open price on hoops is still 1.60c., but 1.50c. is being done on most orders. Bands are 1.40c., with extras as per the steel bar card.

Cotton Ties.—Not much business remains to be placed for this year, most buyers having covered. It is said that the regular price of 84c. per bundle was firmly held on all the larger orders.

Merchant Steel.—New buying is quiet and only in small lots for seasonable steels. Jobbers and dealers are taking in as little as possible, believing that prices may be lower later. Specifications against contracts are fair, but the mills have pretty well caught up on back orders and are now able to make prompt deliveries. Our quotations are still being shaded. We quote: Iron finished tire, $1\frac{1}{2} \times \frac{1}{2}$ in. and larger, 1.40c., base; under $1\frac{1}{2} \times \frac{1}{2}$ in., 1.55c.; planished tire, 1.60c.; channel tire, $\frac{3}{4}$ to $\frac{1}{2}$ in., 1.90c. to 2c.; $1\frac{1}{2}$ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.85c. We quote cold rolled strip steel as follows: Base rates for 1 in. and $1\frac{1}{2}$ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Standard Pipe.—Effective from Friday, August 8, discounts on butt-weld pipe have been lowered one point, or \$2 a ton. No change was made on lap-weld

pipe, the new demand for which is still very heavy. The mills have enough actual business on their books to take all the lap-weld pipe they can make for the next three months or longer. The reason given for the lower prices on butt-weld is that the demand has been dull for some time. On lap-weld and oil-country goods the mills are pretty certain to run full the remainder of the year.

Boiler Tubes.—We note a continued heavy demand for locomotive and merchant tubes, and the mills are well filled for the year. The new demand for seamless tubing is also heavy. With the orders booked and business that will naturally come along, the tube mills will be compelled to run to the utmost capacity to meet the wants of customers. Discounts on iron and steel tubes are very firmly held.

Old Material.—The improvement in the demand for scrap and also the slight betterment in prices seem to have largely disappeared, as the scrap market in the past week has been very dull and prices have eased off. It is stated that the Carnegie Steel Company took practically all the heavy steel scrap included in the last list of the Pennsylvania Railroad, about 2,500 tons, at the reported price of \$15.25 delivered. There is a fair demand for borings and turnings, and some sales have been made in the past week, mostly for delivery at Brackenridge, Pa. Consumers now seem to be pretty well supplied with scrap. Prices on heavy steel scrap are somewhat weaker. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery.....	\$13.00
Ordinary steel scrap.....	\$12.50 to 12.75
Compressed side and end sheets scrap.....	10.50
No. 1 foundry cast.....	12.75 to 13.00
No. 2 foundry cast.....	11.50 to 11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district.....	8.50 to 8.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.....	14.50 to 14.75
No. 1 railroad malleable stock.....	11.50 to 11.75
Grate bars.....	8.25 to 8.50
Low phosphorus melting stock.....	15.75 to 16.00
Iron car axles.....	24.50 to 25.00
Steel car axles.....	17.50 to 17.75
Locomotive axles, steel.....	21.00 to 21.50
Locomotive axles, iron.....	25.50 to 26.00
No. 1 busheling scrap.....	12.00 to 12.25
No. 2 busheling scrap.....	7.50 to 7.75
Old car wheels.....	13.75 to 14.00
Machine shop turnings.....	6.75 to 7.00
Cast-iron borings.....	8.25 to 8.50
Sheet bar crop ends.....	14.00 to 14.25
Old iron rails.....	14.50 to 14.75
No. 1 railroad wrought scrap.....	13.75 to 14.00
Heavy steel axle turnings.....	9.00 to 9.25
Stove plate.....	8.25 to 8.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—The market has quieted down and prices are easier. While no actual sales of standard furnace coke are reported to have been made in the past week at less than \$2.50 per net ton at oven, there have been few sales at that price and a considerable surplus of coke has accumulated. Unless this moves out within a short time there is likely to be a decline in the price. One report has it that an Eastern furnace has bought a round lot for August delivery at \$2.35 at oven, but it is claimed that this coke runs slightly higher in sulphur. The Connellsville Courier gives the output of coke in the Upper and Lower Connellsville regions for the week ending August 2 as 385,065 tons, a decrease over the previous week of about 8,000 tons.

Chicago

CHICAGO, ILL., August 13, 1913.—(By Telegraph.)

Despite the fact that actual buying of iron and steel products is somewhat lighter in this territory, a general feeling of optimism prevails. Interest is now centered on the buying by railroads; while orders from these sources are light, indications point toward better conditions. Actual inquiries for rails and track equipment by these interests are denied though they are feeling out the market. The Southern Railway has placed orders for 1600 cars, involving about 16,000 tons of plates and shapes, an inquiry which has been on the market for some weeks. Sheets and wire products continue the weakest items in the market, and concessions are being made from quoted prices. The pig-iron market is firmer, \$11, Birmingham, being the usual basis for last half orders on Southern irons. The charcoal-iron market is still weak, though tonnage which have been induced during the present low price selling campaign

have reduced stocks to an extent which warrants a withdrawal of the extreme quotations which have been made in some instances. The scrap market shows firmer prices in numerous instances, though unaccompanied by extensive buying on the part of consumers.

Pig Iron.—Blast furnaces with bookings sufficient to guarantee normal operations through the fall are not showing eagerness to make concessions from quoted prices, and the general tendency of the market is firmer. Basic and charcoal irons constituted the bulk of sales in this territory during the past week, the low price of the latter influencing its substitution for malleable Bessemer to some extent. Heavy bookings of charcoal iron are resulting in less eagerness on the part of the furnaces to continue the present price basis though no change of quotations is made. Inquiries are being made to cover through the first quarter of next year, though only one contract for such delivery—that of an Indianapolis firm buying charcoal iron—is reported. Sales of Southern iron show a decrease in size, though an aggregate volume which was obtained through small orders is satisfactory. The general price for last quarter is on a basis of \$11, Birmingham, for No. 2 foundry, though business for August delivery was placed during the week at \$10.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4....	\$14.50 to \$15.50
Northern coke foundry, No. 1.....	15.50 to 16.00
Northern coke foundry, No. 2.....	15.00 to 15.50
Northern coke foundry, No. 3.....	14.50 to 15.00
Southern coke, No. 1 foundry and No. 1 soft	15.60 to 16.10
Southern coke, No. 2 foundry and No. 2 soft	15.10 to 15.60
Southern coke, No. 3.....	14.60 to 15.10
Southern coke, No. 4.....	14.10 to 14.60
Southern gray forge.....	14.10 to 14.60
Southern mottled.....	13.85 to 14.35
Malleable Bessemer.....	15.00 to 15.50
Standard Bessemer.....	18.40
Basic.....	15.00 to 15.50
Jackson Co. and Kentucky silvery, 6 per cent.....	19.40
Jackson Co. and Kentucky silvery, 8 per cent.....	20.40
Jackson Co. and Kentucky silvery, 10 per cent.....	21.40

(By Mail)

Rails and Track Supplies.—Despite the fact that the railroads have been feeling out the market with a view to definite inquiries for their rail requirements for 1914 no such inquiries have appeared. Business is confined to small orders for rails and track fastenings, with insistence on immediate delivery, indicating that purchases represent an urgent need. Mill interests are inclined to an optimistic view of the situation. Prices generally are firm, a reduction in track bolts with square nuts being the only change from previous quotations. We quote standard railroad spikes at 1.75c. to 1.80c., base; track bolts with square nuts, 2.25c. to 2.30c., base, all in carload lots, Chicago; tie plates, \$32 to \$34, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Contracts placed by railroad companies for bridge work constitute the greater part of orders for fabricated products, though material for the smaller building projects which are continually coming up assist in making a volume which is fairly satisfactory to the fabricators. Contracts placed in the past week total in the neighborhood of 5000 tons, the largest being the award to the American Bridge Company by the Chicago, Milwaukee & St. Paul for bridge material to be used in the passenger terminal at Spokane, Wash., 2353 tons. The Lackawanna Bridge Company received a contract from the Chicago, Indianapolis & Louisville Railway Company for 287 tons of bridge spans; the Gage Structural Company has a contract for 405 tons to be used in the Western Newspaper Union's Chicago building; the Elgin, Joliet & Eastern Railway Company has awarded 297 tons to the American Bridge Company for bridges over the Chicago & Northwestern tracks at North Chicago, Ill. The Minneapolis Steel & Machinery Company will fabricate 998 tons for the Ford Motor Company's building at Minneapolis, Minn. We quote for Chicago delivery, from mill, 1.63c.

Jobbers report numerous orders aggregating a satisfactory tonnage, being confined almost entirely to small orders. We quote for Chicago delivery, from store, 1.95c.

Bars.—Absence of railroad purchasing is being felt in this market. Aside from this condition orders are of a satisfactory volume and mills are fairly well taken care of. An increase in orders for bar iron is reported, with no further reduction from the quoted prices.

Mills which have obtained satisfactory bookings are inclined to pass up business rather than make further concessions, while some buyers are holding out with the expectation of lower prices. It is reported that the steel bar purchases of the leading implement interest are in the neighborhood of 40,000 tons. The market appears to be firm at quoted prices and specifications are satisfactory. Steel bars for reinforcing purposes are generally quoted on the basis of 1.50c. We quote for mill shipment as follows: Bar iron, 1.45c. to 1.50c.; soft steel bars, 1.58c.; hard steel bars, 1.50c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

A continued good movement from store is reported by local jobbers, bars for reinforcing purposes being especially in demand. For delivery from store, we quote soft steel bars, 1.85c.; bar iron, 1.85c.; reinforcing bars, 1.85c. base, with 5c. extra for twisting in sizes ½ in. and over, and usual card extras for smaller sizes, shafting 53 per cent. off.

Plates.—Business in plates is confined almost entirely to specifications against contracts already placed. These are reported to be good; and despite the fact that in numerous cases mills are able to make very prompt deliveries, enough is booked to warrant the continuance for the present of previously reported prices. We quote for Chicago delivery, from mill, 1.63c.

Rivets and Bolts.—Scattering orders of small size constitute the principal demand just now for bolts. Manufacturers are seeking business aggressively and prices are shaded in some instances. Structural rivets are reported as slightly lower. We quote from mill as follows: Carriage bolts up to ¾ x 6 in., rolled thread, 75-10-7½; cut thread, 75-12½; larger sizes, 70-12½; machine bolts up to ¾ x 4 in., rolled thread, 75-10-12½; cut thread, 75-10-7½; large size, 70-10-5; coach screws, 80-12½-5; hot pressed nuts, square head, \$6 off per cwt.; hexagon, \$6.70 off per cwt. Structural rivets, ¼ to 1½ in., 2.03c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-7½; larger sizes, 65-5, carriage bolts up to ¾ x 6 in., 70-5; larger sizes, 65 off. Hot pressed nuts, square head, \$5.30, and hexagon, \$5.90 off per cwt.

Old Material.—The local scrap market seems to have resolved itself into a waiting game between dealers and consumers. While prices on numbers of items will be noted as advanced slightly, there is little purchasing being done by the consumer and there are indications on certain lines that dealers who have bought heavily expecting a material advance are now willing to accept lower prices than were first asked. Railroad offerings are being absorbed readily and in many instances at prices above the regular market. The railroad lists for this week total 5200 tons, 3000 tons of which is offered by the Northern Pacific, 2000 tons by the Chicago, Milwaukee & St. Paul, and 200 tons by the Minneapolis, St. Paul & Sault Ste Marie. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails.....	\$14.00 to \$14.50
Old steel rails, rerolling.....	12.25 to 12.75
Old steel rails, less than 3 ft.....	11.25 to 11.75
Relaying rails, standard section, subject to inspection.....	24.00
Old carwheels.....	12.75 to 13.25
Heavy melting steel scrap.....	10.75 to 11.25
Frogs, switches and guards, cut apart.....	10.75 to 11.25
Shoveling steel.....	10.50 to 10.75
Steel axle turnings.....	7.25 to 7.75
Per Net Ton.	
Iron angles and splice bars.....	\$13.50 to \$14.00
Iron arch bars and transoms.....	14.00 to 14.50
Steel angle bars.....	10.25 to 10.75
Iron car axles.....	20.50 to 21.00
Steel car axles.....	16.50 to 17.00
No. 1 railroad wrought.....	10.75 to 11.25
No. 2 railroad wrought.....	10.50 to 10.75
Cut forge.....	10.50 to 10.75
Steel knuckles and couplers.....	10.00 to 10.25
Steel springs.....	10.75 to 11.25
Locomotive tires, smooth.....	11.75 to 12.25
Machine shop turnings.....	5.25 to 5.75
Cast and mixed borings.....	5.00 to 5.50
No. 1 busheling.....	9.50 to 10.00
No. 2 busheling.....	7.25 to 7.75
No. 1 boilers, cut to sheets and rings.....	7.25 to 7.75
Boiler punchings.....	10.50 to 11.00
No. 1 cast scrap.....	11.00 to 11.50
Stove plate and light cast scrap.....	9.75 to 10.25
Railroad malleable.....	10.50 to 11.00
Agricultural malleable.....	9.25 to 9.75
Pipes and flues.....	8.25 to 8.50

Cast-Iron Pipe.—The contract for pipe for the city of Chicago mentioned in last week's report has been formally awarded to the United States Cast Iron Pipe & Foundry Company. New specifications for approximately 2300 tons for Springfield, Ohio, have been drawn

and bids will be opened on August 27. Prices are reported firm, without change. We quote as follows per net ton. Chicago: Water pipe, 4-in., \$28; 6 to 12-in., \$26; 16-in. and up, \$25, with \$1 extra for gas pipe.

Sheets.—A fair demand is reported, though the market continues weak, due to the continued aggressiveness of some mills in seeking new business. We quote for Chicago delivery in carloads from mill: No. 28 black sheets, 2.33c. to 2.48c.; No. 28 galvanized, 3.48c.; No. 10 blue annealed, 1.88c. to 1.93c.

Existing market conditions are offered by local stores as reason for increasing purchases in sheets, some buyers, it is stated, preferring to pay a premium on small lots rather than enter into contracts with mills at present prices. Store prices are as follows: No. 10 blue annealed, 2.15c.; No. 28 black, 2.75c.; No. 28 galvanized, 4c.

Wire Products.—The volume of business consists solely of actual requirements. Prices to jobbers have been reduced as follows: Plain wire, No. 9 and coarser, base, \$1.63; wire nails, \$1.83; painted barb wire, \$1.83; galvanized, \$2.20; polished staples, \$1.83; galvanized, \$2.15, all Chicago.

Philadelphia

PHILADELPHIA, PA., August 12, 1913.

Foundry iron buying has been more general, and price advances are being maintained. At the meeting of the Eastern Pig Iron Association, held last week, a more cheerful feeling prevailed. August statistics compared favorably with July, it being interesting to note that stocks in furnace yards made no appreciable increase. With more furnaces out, a sharp decline in stocks, which at the present time are considered below the average, is expected. On a basic-iron transaction \$14.75 at furnace was done. Finished materials are in irregular demand, 50 to 75 per cent. of capacity representing about the average volume of new business. Billets are quiet. The old material market, while sentimentally stronger, needs sustaining buying.

Iron Ore.—No new business is reported. Consumers are more concerned in having deliveries postponed on purchases made earlier in the year, owing to decreasing consumption. Importations during the week ended August 9 were confined to a cargo of 5200 tons from New Brunswick.

Pig Iron.—While there has been practically no large lot demand for foundry grades, the volume of business coming from the general foundry trade has been better. Consumers are not generally buying for extended shipment, but show less hesitancy in placing orders for lots ranging from 50 to a few hundred tons. Indicative of the more general buying is the statement of one seller, who, during the first ten days of August, sold upward of 9000 tons of foundry grades to 52 different customers, only one sale being over 1000 tons. Price stiffness has had considerable to do with the betterment in the demand, although curtailment of production has also been a strong factor. Recent advances have been well maintained, and additional producers have withdrawn low quotations. The larger proportion of the business closed during the week has been at \$15.65 to \$15.75 delivered, for standard brands of No. 2 X foundry, shipments extending over various portions of the remainder of the year. At the same time options are, in instances, still unclosed at \$15.50 delivered, but little new business is being taken at that price. Several producers holding at \$16 to \$16.75 delivered make moderate sales, but the outside price is admittedly above the market. Some makers allow only a differential of 25c. between No. 2 X and No. 2 plain. Current reports, not substantiated, are that one Delaware River cast-iron pipe maker has bought low grade iron quite heavily. Negotiations have been pending, but it is said that buyer's and seller's ideas are apart about 50c. a ton. Northern low grade iron appears comparatively firm at \$14.50, although fair grades command up to \$15 delivered. There has been practically no movement in rolling mill forge, although one consumer has made a tentative inquiry for 1000 tons. Virginia foundry iron has been selling freely in small lots at \$13 at furnace for No. 2 X. The leading producer has withdrawn from the market on high silicon iron for delivery over the remainder of the year. No. 2 plain is said to be available at \$12.50 to \$12.75 at furnace according to delivery. Odd lots of Southern foundry have been sold in this market at \$11, Birmingham, for No. 2. Little new business comes out in steel making irons. A few hundred tons of Bessemer pig have been sold a local consumer. A transaction involving 3000 tons of basic for New England delivery was closed at about \$14.75 Eastern

furnace. Small sales of low phosphorus iron are being made at unchanged prices. While producers are gradually firming up on quotations, it will require time to eliminate entirely the recent low levels. For delivery in buyers' yards in this vicinity the following range of prices is named for standard brands:

Eastern Pennsylvania No. 2 X foundry	... \$15.50 to \$16.00
Eastern Pennsylvania No. 2 plain	... 15.25 to 15.50
Virginia No. 2 X foundry	... 15.80 to 16.30
Virginia No. 2 plain	... 15.55 to 15.75
Gray forge	... 14.50 to 14.75
Basic	... 15.25
Standard low phosphorus	... 23.00 to 23.50

Ferroalloys.—Lower quotations named during the closing days of last week for 80 per cent. ferromanganese, for delivery over the remainder of the year, have not induced buying. With continued price concessions, buyers hold off, expecting further declines. Small sales, both for Eastern and Western shipment, have been made at \$56, seaboard. Importations last week aggregated 582 tons, a portion of which was put in warehouse. Ferrosilicon is in light demand.

Billets.—The demand for basic open-hearth rolling billets continues easy, although a slight improvement as to forging billets has developed. Current orders are of the hand-to-mouth character. Some small inquiry comes from the West but no business sufficient to test the market has come out. For the ordinary run of business basic open-hearth rolling billets are quotable at about \$28 delivered, with ordinary forging billets ranging from \$33 to \$35 mill.

Plates.—Specifications on contracts are comparatively good but new business shows some irregularity. Few contracts for extended delivery are being made. There is a good miscellaneous demand for marine boiler, structural and tank plates. Ship plates also continue in good demand. One leading Eastern mill reports actual mill shipments in July as being materially larger than June, and August business has been close to capacity. On small business, Eastern mills quote 1.65c. delivered, but on desirable business the Pittsburgh base of 1.45c., or 1.60c. delivered, is named.

Structural Material.—New business has been quieter. Mill orders are mostly made up of miscellaneous small lots while new fabrication work has been confined to small propositions, including some bridge work placed by railroads. Mill operations are largely on old orders, and more prompt shipments are available. Prices for current business in plain shapes remain at 1.60c. delivered, but the market has not been seriously tested.

Sheets.—While reports are to the effect that prices of Western sheets are easier, Eastern mills continue to receive a very good volume of business, mostly small orders, for early shipment, at 1.90c. here, for No. 10 blue annealed. On contracts for extended delivery, Eastern mills would probably name 1.85c. Mill operations continue at practically full capacity but are to some extent catching up on their orders.

Bars.—No large business in iron bars is before the trade. Most mills are fairly well fixed with orders on which specifications have been comparatively good. The larger mills show no disposition to make concessions, holding ordinary iron bars at 1.42½c. to 1.47½c. delivered in this district. On common bars some small mills are said to have shaded these figures. Considerable business is pending in steel bars. New orders continue to be entered at 1.55c. delivered in this district.

Coke.—The volume of business has been smaller. Reduction in the number of active blast furnaces has resulted in a decrease in the demand for furnace coke, prices of which, for extended delivery, continue to be held at \$2.50 at oven. Small contracts and moderate prompt sales of foundry coke continue to be entered at unchanged prices, ranging from \$2.75 to \$3.15 at oven. For delivery in buyers' yards in this vicinity, the following range of prices, per net ton, is named:

Connellsville furnace coke	... \$4.25 to \$4.65
Connellsville foundry coke	... 4.90 to 5.35
Mountain furnace coke	... 4.00 to 4.25
Mountain foundry coke	... 4.50 to 4.75

Old Material.—Sentimentally the market is stronger. Railroad offerings went largely at higher figures, but only a small proportion of the material came to buyers in this market. A more active movement will be required if the strength of the market is to be sustained. There has been some quiet buying in steel scrap, but some mills still maintain low offering prices. Low phosphorus scrap has stiffened sharply. Small sales were made at \$15.50 and dealers are holding at \$16. Railroad wrought scrap is stronger on moderate sales.

For some grades of material such as light iron, busheling scrap, grates and malleable scrap, the market is extremely quiet. Quotations are somewhat irregular and to a large extent nominal; an approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to \$1.35 per gross ton, is as follows:

No. 1 heavy melting steel.....	\$11.50 to \$12.00
Old steel rails, rerolling (nominal).....	14.00 to 14.50
Low phosphorus heavy melting steel scrap (nominal).....	15.50 to 16.00
Old steel axles (nominal).....	17.50 to 18.00
Old iron axles (nominal).....	25.00
Old iron rails.....	17.50 to 18.00
Old carwheels.....	12.50 to 13.00
No. 1 railroad wrought.....	14.00 to 14.50
Wrought-iron pipe.....	11.00 to 11.50
No. 1 forge fire.....	9.50 to 10.00
No. 2 light iron (nominal).....	6.00
No. 2 cut busheling (nominal).....	8.00 to 8.25
Wrought turnings.....	8.00 to 8.50
Cast borings.....	8.00 to 8.25
Machinery cast.....	13.00 to 13.25
Grate bars, railroad.....	9.00 to 9.50
Stove plate.....	9.00 to 9.50
Railroad malleable (nominal).....	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, August 13, 1913.—(By Telegraph.)

Pig Iron.—Curtailement of production in the South has not been without effect on prices, and while there is probably a small tonnage available at \$10.50, Birmingham basis, it is understood that on this iron strictly No. 2 analysis requirements are not met. The majority of furnaces are holding out for \$11 and are getting a fair share of the business now booked. There is also some talk of advancing to \$11.50 for the last quarter. Several tentative inquiries have been received for both Southern and Northern iron for shipment during the first quarter and half of next year, but this business has not yet been worked out, and furnace interests are not disposed to quote that far ahead at the present time. Northern foundry, basic and malleable, are all quoted at \$14, Ironton, for either prompt or last quarter shipment. Sales of foundry iron are mostly confined to small lots, although a few contracts have been made with Indiana and Michigan melters covering 500 to 1000 tons. A purchase of basic was made in this territory by a southern Ohio rolling mill, it being understood that 10,000 tons was contracted for at a figure slightly below the regular market quotation. Among inquiries is one for 500 tons of Southern No. 1 foundry from a northern Ohio melter and a smaller quantity of malleable wanted by an Indiana consumer. Local foundries are still tied up with the molders' strike, and, with the exception of two or three of the stove manufacturers, none is in operation now in the city proper. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft.....	\$14.50 to \$15.00
Southern coke, No. 2 foundry and 2 soft.....	14.00 to 14.50
Southern coke, No. 3 foundry.....	13.50 to 14.00
Southern, No. 4 foundry.....	13.00 to 13.50
Southern gray forge.....	12.50 to 13.00
Ohio silvery, 8 per cent. silicon.....	18.20 to 18.70
Southern Ohio coke, No. 1.....	16.20 to 16.70
Southern Ohio coke, No. 2.....	15.20 to 15.70
Southern Ohio coke, No. 3.....	14.95 to 15.45
Southern Ohio malleable Bessemer.....	15.20 to 15.45
Basic, Northern.....	15.20 to 15.45
Lake Superior charcoal.....	27.25 to 27.75
Standard Southern carwheel.....	27.25 to 27.75

(By Mail)

Coke.—There is no contracting for foundry coke in this immediate vicinity, but the demand from outside foundries is still keeping up to the mark. Coke producers in all three fields are firmly holding prices. In the Connellsville district \$2.50 for either prompt or contract furnace coke is minimum, and on foundry grades \$3 is the average price, with a number of ovens holding out for \$3.25 per net ton at oven. In the Wise County and Pocahontas fields practically the same prices rule, with the possibility of 10c. a ton less in the first named.

Finished Material.—Mill agencies are principally interested at the moment in bidding on several bridges that will be built by outside county authorities. These bridges were washed away by the floods during the spring, and, while none of them will require much material, the number to replace the temporary structures in use will run the total tonnage up to a desirable figure. Local business is still nearly paralyzed, due to the teamsters' strike, which has not yet been settled. However, carload shipments are being received from the mills and dispatched to nearby cities without delay.

The vacation period has had some effect on the demand for all classes of finished material, but outside orders for both galvanized and plain sheets are reported by the nearby mills to be better than was anticipated. The local warehouse price on steel bars is from 1.95c. to 2c. and on structural shapes, cut to lengths, when desired, from 2.05c. to 2.10c.

Old Material.—With the exception of reports from a few local dealers as to a better demand from the rolling mills, there is no change in the situation as previously noted. The local foundries are nearly all idle due to labor troubles, and, while nearby foundries are buying some scrap, their orders are generally for immediate requirements. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap.....	\$7.25 to \$7.75
Old iron rails.....	12.25 to 12.75
Relaying rails, 50 lb. and up.....	19.75 to 20.25
Rerolling steel rails.....	11.25 to 11.75
Melting steel rails.....	9.50 to 10.00
Old carwheels.....	11.00 to 11.50

Per Net Ton	
No. 1 railroad wrought.....	\$9.25 to \$9.75
Cast borings.....	4.75 to 5.25
Steel turnings.....	4.75 to 5.25
No. 1 cast scrap.....	9.00 to 9.50
Burnt scrap.....	6.50 to 7.00
Old iron axles.....	16.75 to 17.25
Locomotive tires (smooth inside).....	10.25 to 10.75
Pipes and flues.....	6.00 to 6.25
Malleable and steel scrap.....	7.50 to 8.00
Railroad tank and sheet scrap.....	4.75 to 5.25

Birmingham

BIRMINGHAM, ALA., August 11, 1913.

Pig Iron.—Seldom in the history of the Alabama iron market has there been such an apparent agreement as to price as exists at this time. Buyers who have made strenuous effort to secure iron under \$11 for No. 2 have met with disappointment. The furnacemen who unloaded at lower figures have, according to all appearances, sold all the iron desired at such prices and are as firm as the rest in the maintenance of the \$11 basis. One furnace company, which has adhered to \$11 throughout, reports sales of 5500 tons the past week, preceded by sales of 6000 tons the week before and has also sold small lots of high silicon at as high as \$12.50. Low grades are hard to get. Furnace management and weather have been good all during the warm spell thus far, and the result has been a maximum of high-grade iron. One company, for instance, up to the second week in the month had not manufactured as much as two car loads of No. 4 foundry. The question with one producing interest is the supplying of its customers according to the orders on books. Another furnace company figures that its large accumulations have been more than taken care of in orders, which approximate 100,000 tons. Taking all things into consideration, it seems fair to quote the Southern, at least the Alabama, iron market as on a flat \$11 level. Some sales may have been made at \$10.75; if so, they were scattered. We quote Alabama iron, per gross ton, f. o. b. furnaces as follows:

No. 1 foundry and soft.....	\$11.00 to \$11.50
No. 2 foundry and soft.....	11.00
No. 3 foundry.....	10.25 to 10.75
No. 4 foundry.....	10.00 to 10.25
Gray forge.....	9.75 to 10.00
Basic.....	11.00 to 11.50
Charcoal.....	24.00 to 25.00

Coal and Coke.—The coal market has been quiet, but all mines continue in operation, and autumn and year contracts are greater in volume than heretofore, while prices are satisfactory. Furnace coke cuts no figure in the trade, as furnace companies make what they want and do not cater as a rule to the general trade. Foundry coke is strong and in good demand. Latest revised quotations are as follows: Furnace coke, per net ton at oven, \$2.75 to \$3.25; foundry coke, per net ton at oven, \$3.75 to \$4.25.

Cast-Iron Pipe.—Pipe manufacturers are more optimistic than they have been in some time. They are inclined to believe that the municipal bond market will improve in the near future and that some good contracts will follow. For the present they are pursuing a conservative policy, although production is something like normal and is being taken care of by the number of small orders. We quote 4-in. at \$22 and 6-in. upward at \$20, with \$1 added for gas pipe.

Old Material.—The market is reflecting the better conditions in the pig-iron trade, and inquiries have improved. Transactions are still closely confined to small lot and hurry propositions. We quote per gross ton, f. o. b. dealers' yards, as follows:

Old iron axles (light)	\$15.00 to \$15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	10.50 to 11.00
Standard carwheels	12.00 to 12.50

Cleveland

CLEVELAND, OHIO, August 12, 1913.

Iron Ore.—Shipments for the month will be curtailed somewhat by the strike of the dock laborers at Duluth and Superior last week, but it is not expected that this trouble will affect the movement for the season. The strike started at the Great Northern dock at Allouez and spread to the Duluth, Missabe & Northern dock at Duluth. For a time it was feared that it would extend to Two Harbors. However, the strike was practically broken at the end of the week when many of the workmen returned to work. It will be several days before ore is moving at its normal volume. During the strike many boats were delayed or forced to go to other docks for cargoes. No inquiries or sales are reported. We quote prices as follows: Old range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; Old range non-Bessemer, \$3.60; Mesaba non-Bessemer, \$3.40.

Pig Iron.—A moderate volume of new business continues to come out in contracts for foundry grades for the last half delivery. While quotations have not been advanced, prices are firmer and \$14 at Cleveland or Valley furnace appears to represent the bottom of the market. One local producer is still quoting No. 2 foundry at \$14.50, delivered. However, consumers who want other brands for a mixture are compelled to pay higher prices. We note one sale of a 2000-ton lot to a Cleveland consumer for delivery during the remainder of the year at the regular Valley price, or \$14.90, delivered Cleveland. Among the new inquiries is one from a local consumer for about 1400 tons of foundry iron. Several sales in lots of around 500 tons are reported and some inquiries are pending for similarly sized lots. Many consumers had previously bought enough iron to last them well into the third quarter but their supply will soon be exhausted, and in view of the present condition of the market they are now placing contracts for their requirements. Southern iron is quiet, but prices are firmer. All producers are apparently now holding to \$11, Birmingham, for No. 2 Southern for the last half but some Southern iron for prompt shipment can be had at \$10.75. For prompt shipment and for the last half we quote delivered Cleveland, as follows:

Bessemer	\$16.40
Basic	15.00
Northern No. 2 foundry	\$14.50 to 14.90
Southern No. 2 foundry	15.10 to 15.35
Gray forge	14.25
Jackson County silvery, 8 per cent. silicon	20.55

Coke.—There is a fair demand for foundry coke contracts and considerable business is coming out in spot shipment orders. The market is very firm and some producers have advanced prices for contracts to \$3.25. We quote standard makes of foundry coke at \$2.90 to \$3 per net ton at oven for prompt shipment and \$2.90 to \$3.25 on contract. Furnace coke continues very firm at \$2.50.

Finished Iron and Steel.—The market is quiet both in specifications and new business. While a fair volume of current orders is coming out they are generally small and for early delivery. There is little inquiry for round lots of material for specific work or for contracts. Buyers are playing a waiting game as to their future requirements, and selling agencies generally are not very active in looking for business, preferring to wait until the mills are better caught up on deliveries. The structural situation is quiet, and while little new work is being figured the outlook is promising. Bids will be opened August 16 for piers and one arch for the Superior avenue bridge in Cleveland. This part of the work will require 2360 tons of reinforcing bars and 380 tons of structural material. There is a good demand for hard steel bars for reinforcing purposes, which are firm at 1.40c., Pittsburgh. Sheets are inac-

tive and prices are irregular. The usual quotation of 2.25c. for No. 28 black sheets is being shaded. No. 28 galvanized sheets are quoted at 3.25c. to 3.35c. and No. 10 blue annealed at 1.65c. In the rivet market the general shading of \$2 a ton noted last week has been followed by further concessions. Nominally the market is 1.90c., Pittsburgh, for structural rivets and 2c. for boiler rivets, but apparently little effort is being made to maintain these prices. The demand for light rails continues quite active. There is little demand for iron bars, which are quoted at 1.50c., Cleveland. Warehouse business is moderate, showing some improvement over the previous week. Prices out of stock are 2c. for steel bars and 2.10c. for plates and structural material.

Old Material.—The market to some extent presents the aspect of a deadlock between dealers and consumers. Dealers generally look for better prices later and do not care to sell much scrap at present quotations. However, the mills not only are unwilling to pay any advance in price, but will buy very little material at the ruling prices. The local rolling mills that are again in operation are buying no scrap. One Cleveland consumer is offering \$11 to \$11.25 for heavy steel scrap. The Upson Nut Company, which recently had an embargo on, is now accepting some shipments. The recent purchase of a round lot of turnings by a Cleveland dealer has caused that grade to advance 25 cents. We quote f. o. b. Cleveland as follows:

Per Gross Ton.	
Old steel rails, rerolling	\$13.00 to \$13.50
Old iron rails	14.50 to 15.00
Steel car axles	17.00 to 17.50
Heavy melting steel	11.00 to 11.25
Old carwheels	12.50 to 13.00
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	10.00 to 10.50
Railroad malleable	11.00 to 11.50
Light bundled sheet scrap	8.00 to 8.50

Per Net Ton.	
Iron car axles	\$20.00 to \$21.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	4.50 to 4.75
Steel axle turnings	7.00 to 7.50
No. 1 busheling	9.50 to 9.75
No. 1 railroad wrought	10.50 to 11.00
No. 1 cast	11.00 to 11.50
Stove plate	8.50 to 8.75
Bundled tin scrap	10.00 to 10.50

The Rich-Fertel Company, scrap iron dealer, Cleveland, has been dissolved and the business will hereafter be conducted by S. Fertel under the name of the Fertel Company. Louis Rich, who retired from the company, has purchased the scrap yard of A. Rotter & Co., 1962 Scranton road, and will engage in business at that address under the name of the Louis Rich Iron & Metal Company. A. Rotter & Co. have retired from the yard business only.

St. Louis

ST. LOUIS, Mo., August 11, 1913.

Buying continues heavy and is becoming increasingly general, being influenced by actual needs. Optimistic views as to future business, though affected in spots by bad crop reports, improved building prospects in Missouri as a result of the settlement of the insurance difficulties, and the evident belief that prices cannot be expected to go lower or, perhaps, remain long as low as they are now, are also factors.

Pig Iron.—The activity is evidenced by the short time which inquiries remain open, indicating that consumers are getting close to the point of definite need. Prices are much more firmly held than a week ago and \$11 is regarded as the absolute bottom for No. 2 Southern foundry, Birmingham, with an increasing number of furnaces refusing to consider that figure, even for regular customers, except on submission by representatives. Local representatives have received instructions to make quotations for Chicago iron at \$15 for malleable, basic and No. 2 X foundry. The Ohio quotations were made \$14 to \$14.50 for No. 2 foundry and malleable. Sales reported ran into a considerable aggregate: they include one of 1500 tons of Northern No. 2 foundry, several of 200 tons each of Northern and a considerable number of minor lots as well as some late transactions involving quite a large tonnage in the aggregate. A late inquiry was for 500 tons of Virginia iron.

Coke.—Demand has been more active with a stiffened price for prompt shipment and the figure for future deliveries firmly held. Several sales of small lots and up to 500 tons were made, also one of 1000 tons for delivery into next year. A number of ovens have withdrawn from the market. By-product coke from

other points than Joliet is selling on a basis of Connellsville prices. Joliet rules higher and is not being sold here now except for special purposes.

Finished Iron and Steel.—In the finished product market some increase of new business is noted and the flow of orders is becoming smoother, though none are very large individually. The demand for structural material on existing contracts is growing more insistent. The settlement of the Missouri insurance situation is expected to open up some business that has been held back pending settlement, including two or three hotel contracts and some other business buildings. The fabricating shops are urging material forward on contracts, taking full allotments as rapidly as obtainable. In general the new business is reported to be 60 to 65 per cent. of the shipments, with an upward tendency. Reinforcing bars are in better demand, but ordinary bars are in only fair request. Quick shipment, however, on contracts and on new business is being urged. No new business appeared during the week in standard rails, but in light rails the coal interests increased their takings, indicating preparations for a busy winter season. Track fastenings have been in only fair request.

Old Material.—The scrap market shows a distinctly better tone and is very strong at the prices noted. There is more inquiry from the steel plants and foundries and the rolling mills are taking material more freely, the embargoes, in large part, having been removed to a degree. Relaying rails continue to be in good request, with practically none to be had. Continued improvement in the old material market is looked for and with the stiffening apparent in pig iron prices the better tone will be maintained. Dealers are much more inclined to buy than for some time. Lists out for the week include one from the Mobile & Ohio for 600 tons and one from the Kansas City Southern of 500 tons. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$11.50 to \$12.00
Old steel rails, re-rolling	11.50 to 12.00
Old steel rails, less than 3 ft.	10.25 to 10.75
Relaying rails, standard section, subject to inspection	23.50 to 24.50
Old carwheels	11.00 to 11.50
Shoveling steel	10.00 to 10.50
Heavy melting steel scrap	10.00 to 10.50
Frogs, switches and guards cut apart	10.00 to 10.50

Per Net Ton.	
Iron fish plates	\$11.00 to \$11.50
Iron car axles	18.75 to 19.25
Steel car axles	15.00 to 15.50
Wrought arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.25 to 9.75
Railroad springs	8.00 to 8.50
Steel couplers and knuckles	8.00 to 8.50
Locomotive tires, smooth	10.50 to 11.00
No. 1 dealers' forge	6.50 to 7.00
Mixed borings	3.50 to 4.00
No. 1 busheling	8.50 to 9.00
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
No. 1 cast scrap	8.50 to 9.00
Stove plate and light cast scrap	7.50 to 8.00
Railroad malleable	8.00 to 8.50
Agricultural malleable	7.00 to 7.50
Pipes and flues	6.50 to 7.00
Railroad sheet and tank scrap	5.50 to 6.00
Railroad grate bars	6.75 to 7.25
Machine shop turnings	5.25 to 5.75
Bundled sheet scrap	4.50 to 5.00

German Conditions Slightly Improved

Steel Bars More Active at Higher Prices—Mills Making Other Products Working Irregularly

BERLIN, July 31, 1913.

A better tendency, in part, has become apparent in the iron trade within a week; and for the first time in some months an advance in prices can be reported. This refers, indeed, only to steel bars; but the improvement at this one point creates the impression that the downward courses of prices in general has now been about checked. The turn in the tide took place, singularly enough, in connection with the break-down of the negotiations for organizing the bar trade. The first effect of that failure, as mentioned last week, was a reduction in prices; but dealers, after a sober second thought, came to the conclusion that the failure of the syndicate negotiations really meant that they were not going to be able to fill their export engagements at as low prices as they had hoped. They had sold short of the market, expecting to buy at lower prices, a hope that had been encouraged by the fact that the proposed syndicate was to grant a drawback of 12 marks (\$2.86) a ton for encouraging the export trade. When this sit-

uation became fully realized, dealers proceeded to buy at a lively rate, and prices recovered 1 to 3 marks (71c.) a ton. The export price of bars is now given at 96 to 97 marks (\$22.85 to \$23.09), but other authorities quote as low as 94 marks (\$22.37). It is reported that large quantities of bars have been bought by the home trade. In the Luxemburg, Lorraine and Saar districts the export price of bars has been reduced to 77 francs (\$14.86) for export to Belgium.

Irregularity in Other Branches

Several days ago a movement in the international beam combination in favor of a reduction on that product of 2 to 3 marks (48c. to 71c.) a ton for export was mentioned; but it is not yet known here whether such action has been taken. In the Luxemburg district foundry pig iron has been reduced to 77 francs (\$14.86) for export to Belgium.

General market reviews indicate considerable irregularity in the degree of employment of the mills. Some lines afford steady work, while others are becoming slack. Plate mills in the Siegerland region have reduced hours, while they have work in the Rhenish district for two to three months. This does not apply to ship plates, in which orders run beyond the end of the year.

The demand for ores continues good, and the output of the mines is going into consumption without delay. Buying for 1914 delivery has begun with furnaces that have no long-standing contracts in force. The position of pig iron has undoubtedly grown less satisfactory. The calls for delivery on order have fallen off to some extent; but, on the other hand, some supplementary buying for 1913 delivery is still occurring. Shipments this month, it is believed, have been of about the same volume as for June. Scrap iron is dull; the demand from open-hearth steel plants has fallen off, and prices are still tending downward.

The position of semi-finished steel is also further weakening. In the export trade, however, the recent increase of the drawback on export orders has stimulated buying to some degree. In the home trade the demand is growing lighter, the pure rolling mills having reduced their takings. Steel rails and other railroad material continue in a strong position, but structural shapes show no improvement on their previous dullness.

The Bar and Plate Trades

The bar mills are now mostly better supplied with work, as intimated above; but the amount of orders in hand varies greatly among the individual manufacturers. It is reported that specifications on old orders are coming in briskly, from which it is inferred that there is a considerable reserve demand at hand. Deliveries are now being made very promptly; only in a few cases are periods of two to four weeks for shipment stipulated by the mills. Much uncertainty is still felt about the price situation. While there is a pretty general belief that bottom prices have now been touched and passed, there is also a feeling that prices will still go lower. For open-hearth steel bars the price is still 100 marks (\$23.80), or even a little higher; but it is mentioned that ordinary steel bars have been sold below 90 marks (\$21.42) in the Luxemburg-Lorraine district.

Heavy plates are still weakening under the competition of big independent mills that have recently come into operation. The prospects for a continuance of good orders for ship plates are good, as new steamships are still being ordered at the German yards. The calls for delivery are light at this writing, owing to a serious strike at most of the shipyards. Prices for heavy plates have further fallen to 114 marks (\$27.13), which, apparently, is the minimum. It is asserted that some of the mills cannot earn a profit at that price. For thin plates prices have dropped to 124 to 125 marks (\$29.51 to \$29.75), while 120 to 122 marks (\$28.56 to \$29.04), are mentioned as bottom prices for medium grades. There is sharp competition for foreign orders in plates of all grades.

The position of gas pipe has improved since the organization troubles of several weeks ago. Consumers have been buying more actively, and prices have kept comparatively steady. In boiler tubes an even better state of things prevails, and the works are mostly well employed. In cast-iron pipe the amount of work in hand is satisfactory, but prices are very low. Other departments of the trade show little or no change.

The Bochumer Verein has declared a dividend of 14 per cent., the same as for last year but on an increased capital. Gross earnings amounted to 8,900,000 marks (\$2,118,200), as compared with 6,800,000 marks (\$1,618,400) last year.

British Steel Bars and Plates Lower

Pig Iron in a Little More Demand—Cleveland Ironmasters Abandon Scheme for Fixing Prices

(By Cable)

LONDON, ENGLAND, August 13, 1913.

The scheme of the Cleveland ironmasters has been abandoned as regards fixing of prices and control of production, but it is still hoped to prevent pig iron going into public stores. Pig iron is steady, with a little more demand. Increased buying of steel is due, but the market is weak, the official reductions made on bars and plates being regarded as forerunners of further cuts. Stocks of pig iron in Connal's stores are 192,230 tons, against 194,356 tons last week. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 54s. 11d. (\$13.36), against 55s. (\$13.38) a week ago.
No. 3 Cleveland pig iron, makers' price f.o.b. Middlesbrough, 55s. 9d. (\$13.56), unchanged.
Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. (\$23.11).
German sheet bars, f.o.b. Antwerp, 87s. 6d. (\$21.29).
German 2-in. billets, f.o.b. Antwerp, 80s. (\$19.46).
German basic steel bars, f.o.b. Antwerp, £4 15s. (\$23.12).
French blooms, 77s. (\$18.73), f.o.b. shipping port.
French sheet bars, 82s. 6d. (\$20.07), f.o.b. shipping port.
Steel bars, export f.o.b. Clyde, £6 12s. 6d. (\$32.24), against £6 17s. 6d. (\$33.46) a week ago.
Steel joists, 15-in., export f.o.b. Hull or Grimsby, £6 8s. 6d. (\$31.02).
German joists, f.o.b. Antwerp, £5 8s. to £5 11s. (\$26.28 to \$27.01).
Steel ship plates, Scotch, delivered local yards, £7 15s. (\$37.72) against £8 7s. 6d. (\$40.76) a week ago.
Steel black sheets, No. 28, export f.o.b. Liverpool, 10s. (\$45.02).
Steel rails, export f.o.b. works port, £6 12s. 6d. (\$32.24).
Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 18s. 1½d. (\$3.19).

Buffalo

BUFFALO, N. Y., August 13, 1913.

Pig Iron.—Sales of upward of 27,000 tons of foundry irons and malleable and an increased volume of inquiry among all of the furnace interests of the district have placed the market on a stronger base than it was a week ago. The strengthening has caused prices to be more firmly held, but so far the schedule has undergone no advance. An improvement of sentiment among consumers is reported by all of the selling interests. Buyers who entered orders recently for immediate needs are requesting that their placements be increased, in some instances doubled. This is looked upon as an indication that consumption is increasing, as the bulk of the iron going out at the present time is going into immediate use because of the low volume of stocks on hand in the foundry yards. Quotations, f.o.b. Buffalo, are as follows:

No. 1 foundry	.....	\$14.00 to \$14.50
No. 2 X foundry	.....	14.00 to 14.25
No. 3 plain	.....	13.75 to 14.00
No. 3 foundry	.....	13.75
Gray forge	.....	13.75
Basis	.....	14.00 to 14.50
Malleable	.....	14.00 to 14.50
Charcoal (regular brands)	.....	15.75 to 16.75
Charcoal (special brands)	.....	16.50 to 17.50

Finished Material.—The mills and agencies of the Buffalo district report that the falling off in the volume of specifying is not due to a reduction of consumption on the part of the users, but to a readjustment of their stocks to balance up with the better deliveries that the mills are now able to make. The market is still considered strong. No cancellations have been reported here in any of the major lines. Prices on bars, plates and shapes are being as firmly held as they have been throughout the year. The principal activity of the week was in reinforcing bars. The fabricators are actively engaged in getting out structural under contract. Bartels Bros. Company, Syracuse, N. Y., is in the market for 200 tons for an addition to its brewery. The Development & Funding Company, Niagara Falls, N. Y., will require about 100 tons for the same purpose.

Old Material.—The only activity during the week was in cast-iron borings, and the trading in this line was not sufficient to cause a change of prices. The

inquiry for this line came from the Valley, as was reported a week ago. There continues to be no local market for heavy melting, old carwheels and the other lines, but the dealers here are holding out for better prices, in keeping with the improvement noted in the pig-iron trading. Price schedules remain the same as they were a week ago. Quotations, f.o.b. Buffalo, per gross ton, are as follows:

Heavy melting steel	.....	\$11.00 to \$11.50
Boiler plate, sheared	.....	12.50 to 13.25
Bundled sheet scrap	.....	8.00 to 8.50
No. 1 busheling scrap	.....	10.50 to 11.00
No. 2 busheling scrap	.....	8.00 to 8.50
Low phosphorus steel scrap	.....	16.50 to 17.00
Iron rails	.....	15.00 to 15.50
No. 1 railroad wrought	.....	13.00 to 13.50
No. 1 railroad and machinery cast scrap	.....	13.00 to 13.50
Steel axles	.....	17.00 to 17.50
Iron axles	.....	22.50 to 23.00
Carwheels	.....	13.00 to 13.50
Railroad malleable	.....	12.00 to 12.50
Locomotive grate bars	.....	10.00 to 10.50
Stove plate, (net ton)	.....	9.75 to 10.00
Wrought pipe	.....	9.50 to 10.00
Wrought iron and soft steel turnings	.....	6.00 to 6.50
Clean cut borings	.....	6.25 to 6.75
Bundled tin scrap	.....	14.00

Boston

BOSTON, MASS., Aug. 12, 1913

Old Material.—For the first time in weeks the dealers see signs of an awakening of the market. As yet the indications are not wholly tangible; they are rather the straws that show whence the wind blows. Prices have not been influenced, except perhaps sentimentally. But everyone expresses a feeling of certainty that the bottom has been reached. The mills are showing some interest in scrap, and the brokers are no longer selling short. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	.....	\$8.25 to \$8.50
Low phosphorus steel	.....	13.50 to 14.50
Old steel axles	.....	13.50 to 14.00
Old iron axles	.....	21.00 to 21.50
Mixed shafting	.....	13.00 to 13.25
No. 1 wrought and soft steel	.....	10.25 to 10.50
Skeleton (bundled)	.....	6.75 to 7.00
Wrought-iron pipe	.....	8.00 to 8.25
Cotton ties (bundled)	.....	7.75 to 8.00
No. 2 light	.....	3.50 to 4.00
Wrought turnings	.....	4.25 to 5.00
Cast borings	.....	4.75 to 5.00
Machinery, cast	.....	11.50 to 12.00
Malleable	.....	10.00 to 10.50
Stove plate	.....	7.50 to 7.75
Grate bars	.....	6.00 to 6.25
Cast-iron carwheels	.....	13.50 to 14.00

New York

NEW YORK, August 13, 1913.

Pig Iron.—Sellers report a fair run of orders, particularly from foundries of moderate or small capacity. The effort of the furnaces to get more money has not frightened off buyers of this class, for as a rule they do not expect to buy at the lowest level. Some of them prefer, in fact, to pay a little more than this if they can have some assurance that the new price will hold, and particularly if there is improvement enough to warrant a little higher price for castings. Not all the large buyers took hold at what are now shown to have been the bargain prices of July, but the fact now stands out more clearly that some furnaces sold up pretty close to their capacity for the next three or four months. Very little has been done for shipment in 1914, though a few buyers are willing to contract through the first half. While the situation does not clearly present a case of buying checked by advancing prices, it is evident that some buyers are waiting to see what concessions, if any, will develop from the new asking prices of the past two weeks. So far as Buffalo iron is concerned any large sales now made for Eastern delivery must take account of the possibility of somewhat higher canal freights later in the season. The leading producer of Virginia iron is sold up on No. 2 X foundry to the end of the year at its present rate of output. The usual price on Virginia iron is \$13 at furnace for No. 2 X, but sales of No. 2 plain are made at \$12.50. There is little change in the prices quoted by eastern Pennsylvania furnaces for

shipment into New Jersey, but it would now be difficult to get iron for forward delivery at \$15 at such furnaces for No. 2 X. We quote Northern iron for tide-water delivery as follows: No. 1 foundry, \$15.75 to \$16; No. 2 X, \$15.50 to \$15.75; No. 2 plain, \$15.25 to \$15.50. Southern iron is quoted at \$15.50 to \$16 for No. 1 foundry and \$15 to \$15.50 for No. 2.

Structural Material.—Inquiries for railroad bridge work are conspicuous for both number and volume, and in some quarters are taken as a positive encouraging index of a broadening in demand to result from the admittedly more favorable attitude of financial interests. No improvement, however, is noted in other lines of fabrication and demand is largely limited to immediate needs, with mill shipments of plain material at 1.45c., Pittsburgh, even for deliveries in 10 days. Structural mills have orders booked for some time ahead, but the mill schedules commonly allow for inserting material urgently required. Local building fabricators are not much work ahead and it cannot be said that there is yet much evidence of early settlement of a considerable number of projects in the hands of architects. The largest items of the railroad activity include 350 tons for the Chesapeake & Ohio, over the Miami River, awarded to the American Bridge Company; 200 tons for the Boston & Maine, likewise awarded to the American Bridge Company; 2000 tons for new division shops for the Chicago & Alton at Bloomington, Ill.; 600 tons for a Straus bascule bridge in Chicago; 400 tons for eight bridges for the New York Central; 200 tons for the Pennsylvania; 200 tons for the grillages and 100 tons for canopies for the terminal in New York of the New York Central; 200 tons for the Central Railroad of New Jersey at Ashley, Pa.; 1000 tons for the Maine Central, on which bids have been taken, and 300 tons for the New Haven for eight bridges, which it is thought have at this writing been closed. Bids have also been submitted on 3500 tons for elevated and subway work in New York and others for 10,000 tons, for section 1, routes 36 and 37, are to be taken August 19. In general building lines a 400-ton building at Troy, N. Y., for the New York Telephone Company, is in the market, and the American Bridge Company has taken 400 tons for an apartment house in Philadelphia. We quote plain material mill shipments at 1.45c., Pittsburgh, or 1.61c., New York, and from store at 2.10c. to 2.15c.

Plates.—Betterment in financial circles seems not yet to have resulted in any new development of car inquiries, and the local general plate market is without change save that even a fairly desirable tonnage may be bought from the Eastern mills at the Pittsburgh mills' price, or 1.61c., New York. The only large railroad car purchase is that of the Southern Railroad, which placed 420 cars with the Mt. Vernon Car Mfg. Company and 1300 with the American Car & Foundry Company. An unconfirmed report credits the Haskell & Barker Car Company with 3500 cars for the Northern Pacific. The Chicago & Illinois Midland is expected to close this week for 250 gondolas and the Pere Marquette may buy some passenger cars. We quote plates at 1.61c. to 1.66c., New York.

Bars.—The total of new business and of specifications on contracts was somewhat larger for the week since the last report than for the week preceding, and to that extent is there an indication of a betterment in sentiment. The conditions back up contentions that the turning point has been reached, particularly in view of the fact that local orders on the mills in July, including specifications on contracts of course, were greater than in June. It remains that additional new business would be welcome. Nothing unusual was learned of in either steel or iron bar purchases or inquiries, and we quote mill shipments of steel bars at 1.56c., New York, and shipments from store at 2c. to 2.05c., and bar iron from mill at 1.40c. to 1.45c., and from store 2.05c. to 2.10c., though one instance of only a fair tonnage of iron was noted moving at 2.03c. from store.

Ferroalloys.—The leading foreign producers of 80 per cent. ferromanganese have reduced the price from \$58.50 to \$56 per ton, Baltimore. Thus far this has not stimulated the market, which continues dull, though an inquiry for 1000 tons has been revived. In ferrosilicon there is a good steady business, with quotations unchanged at \$75 for carload lots of 50 per cent., at \$74 for 100 tons and \$73 for 600 tons or over.

Cast-Iron Pipe.—The Department of Water Supply, Gas and Electricity of the city of New York will open bids on Thursday, August 14, for about 3300 tons of 6 to 20 in. for the borough of Queens. The contract placed by Worcester, Mass., July 28 went to the lead-

ing interest at \$22.30, delivered. The city of Philadelphia is planning for about five miles of mains as extensions to its water distributing system, but the matter is not yet in shape for advertising for proposals. More talk is heard of the Staten Island project, but it has not yet taken definite shape. Private buying shows little life. Prices of carload lots of 6 in. are \$23 to \$24 per net ton, tidewater.

Old Material.—Railroad lists closed last week brought somewhat higher prices than have recently been ruling, indicating that the market is on a firmer foundation. Probably the large consumers will give more attention to dealers, now that the railroad offerings are out of the way. So far little business has been coming to the dealers but sentiment shows an improvement and prices are easily 50c. per ton higher. Dealers' quotations are as follows, per gross ton, New York.

Old girder and T rails for melting.....	\$9.00 to \$9.50
Heavy melting steel scrap.....	9.00 to 9.50
Relaying rails.....	21.50 to 22.00
Rerolling rails.....	12.50 to 13.00
Iron car axles.....	21.00 to 21.50
Steel car axles.....	14.50 to 15.00
No. 1 railroad wrought.....	11.75 to 12.25
Wrought-iron track scrap.....	11.00 to 11.50
No. 1 yard wrought, long.....	10.50 to 11.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.50 to 5.00
Cast borings.....	5.25 to 5.75
Wrought turnings.....	4.50 to 5.00
Wrought pipe.....	8.75 to 9.25
Carwheels.....	12.50 to 13.00
No. 1 heavy cast, broken up.....	10.75 to 11.25
Stove plate.....	8.00 to 8.50
Locomotive grate bars.....	7.50 to 8.00
Malleable cast.....	9.00 to 9.50

Metal Market

NEW YORK, August 13, 1913.

The Week's Prices

Copper, New York.		Cents Per Pound for Early Delivery.		Lead		Spelter	
		Electro-lytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
Aug.	Lake.						
7.....	15.75	15.50	41.50	4.50	4.40	5.65	5.50
8.....	15.75	15.50	41.75	4.50	4.40	5.65	5.50
9.....	15.75	15.50	41.62½	4.50	4.40	5.65	5.50
11.....	15.87½	15.62½	42.10	4.50	4.40	5.65	5.50
12.....	16.00	15.62½	41.75	4.50	4.40	5.65	5.50
13.....	16.00	15.75	41.75	4.50	4.40	5.65	5.50

Copper is active, strong and advancing. Tin remains quiet with some fair buying. Lead is quiet though firm. Spelter is quiet with a slight advance. Antimony continues inactive.

New York

Copper.—Since last week's report there has been a great deal of activity in this market with large transactions, but it is not possible to state how much has been sold. The buying has been mostly domestic, though Europe has been considerable of a factor. The present movement started last Wednesday with an advance in price of ¼c. per lb. and heavy sales. This condition continued on the following day and there has been more or less buying since with steadily advancing prices. This is due to the strike situation in the Lake Superior district which continues unchanged and to the sentiment created by the excellent monthly report of the Copper Producers' Association for July. Buyers have hurried into the market. Lake copper is hard to get, but those who possess it are looking after their customers and some business has been done. Early deliveries of copper, namely, for August and September, are scarce at any price. Electrolytic is quoted to-day at 15.75c., cash, New York, and Lake at 16c., this being nominal. Expectations of higher prices are noted. London quotations were £69 15s. for both spot and futures. Exports for August to date total 12,929 tons.

Lead.—The market is quiet and dull, but firm. Sellers are asking 2½c. per 100 lb. more in St. Louis than last week, but they are not doing much business and seem to be indifferent. There are rumors of more or less serious labor troubles in Missouri which will be a disturbing factor if a strike results. The future of the market depends on the outcome of these troubles. Also the market may be affected indirectly by the Mexican situation unless it improves rapidly. Quotations are 4.50c., New York, and 4.40c., St. Louis.

Pig Tin.—Considerable business was done last Wednesday, when sales amounted to about 300 tons, for delivery in 45 to 60 days. Consumers were the principal buyers. Business was dull the following day with renewed activity on Friday and Saturday, the buying on Friday being mostly by dealers. Since

When the market has been quiet with very little business. The situation is considered strong with the supply concentrated but ample for spot buying. Quotations in London to-day were £188 10s. for spot and £187 5s. for future, while the New York price is \$75c. Arrivals this month amount to 1250 tons with 25 tons afloat.

Spelter.—This market is firm but quiet, there having been no important transactions during the week. Prices have advanced slightly, quotations now standing at 5.50c. to 5.55c., St. Louis, and 5.65c. to 5.70c., New York.

Antimony.—There is plenty of antimony to be sold, but there is no demand and the market continues lifeless. Quotations remain the same with Hallett's at 8.5c. to 8c., Cookson's at 8.35c. to 8.40c., and Chinese and Hungarian grades at 7.50c. to 7.75c.

Old Metals.—Dealers' selling prices are firmly maintained as follows:

	Cents per lb.
Copper, heavy and crucible.....	14.25 to 14.50
Copper, heavy and wire.....	14.00 to 14.25
Copper, light and bottoms.....	13.00 to 13.25
Brass, heavy.....	9.50 to 9.75
Brass, light.....	8.00 to 8.25
Heavy machine composition.....	13.25 to 13.50
Clean brass turnings.....	8.75 to 9.00
Composition turnings.....	11.75 to 12.00
Lead, heavy.....	4.25
Lead, tea.....	4.10
Zinc, scrap.....	4.00

Chicago

AUGUST 11.—An increased buying movement, together with the Michigan copper miners' strike, is resulting in higher prices on copper. Considerable buying of old metals is also being done, and slight advances are noted in red brass, tinfoil and block tin pipe. We quote as follows: Casting copper, 15.75c.; Lake, 16c., in carloads for prompt shipment; small lots, 1/4c. to 3/8c. higher; pig tin, carloads, 41.50c.; small lots, 43.50c.; lead, desilverized, 4.45c. to 4.50c.; corroding, 4.70c. to 4.75c. for 50-ton lots; in carloads, 2 1/2c. per 100 lb. higher; spelter, 5.60c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc is \$7.50, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices or less than carload lots: Copper wire, crucible shapes, 2.50c.; copper bottoms, 11.25c.; copper clips, 12.50c.; red brass, 12c.; yellow brass, 8c.; lead pipe, 3.50c.; zinc, 3.75c.; pewter, No. 1, 26c.; tinfoil, 33c.; block tin pipe, 37c.

St. Louis

AUGUST 11.—The trading has been particularly active the past week and prices have been especially firm in both lead and spelter. In lead a heavy tonnage changed hands. The close to-day was firm at 4.40c. to 4.45c. Spelter was active and strong all the week in a range of 5.50c. to 5.60c. and closed to-day at the top. The tonnage sold was the heaviest in months. Copper ruled strong. Lake closing firm at 16.35c. and electrolytic at 16.10c. to 16.20c. Tin was quiet, closing the week at 41.85c. to 42.35c. Cookson's antimony was nominal at 8.75c. to 8.85c. In the Joplin ore market there was increased activity, and the range of the basis price for 60 per cent. zinc blende was \$44 to \$46.50 per ton, with settlements for the best lots as high as \$48.50. The market for calamine was firm at \$21 to \$22 per ton for 40 per cent. and the choicest commanding as high as \$25. Lead ore was firm at the advance reported last week with heavy sales at \$54.50 for 80 per cent. We quote miscellaneous scrap metals as follows: Light brass, 6c.; heavy brass and light copper, 10.50c.; heavy copper and copper wire, 11c.; zinc, 2.75c.; lead, 3c.; pewter, 21c.; tinfoil, 30c.; tea lead, 2.75c.

Operating earnings of the American Steel Foundries for the quarter ended June 30 were \$533,204, as against \$217,502 for the same quarter in 1912, and a deficit of \$16,163 for the same portion of 1911. The net profit amounted to \$255,639, compared with \$102,902 last year, and a \$165,060 deficit in 1911. For the six months to June 30, net profits were \$642,511, or \$530,282 more than in the first half of 1912, notwithstanding a payment of \$171,840 for the retirement of the 4 per cent. debentures, which began this year.

The Lloyd-Booth department of the United Engineering & Foundry Company, Youngstown, Ohio, is building a 2000-ton high-speed forging press for the Pennsylvania Steel Company, Steelton, Pa., and is also building two Pittsburgh drop hammers, one of 2000-lb. and one of 1000-lb. capacity, for the Brooklyn Navy Yard.

Iron and Industrial Stocks

NEW YORK, August 13, 1913.

The stock market has continued its upward course, with United States Steel stocks among the leaders in the advance. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

Am. Can, com.....	32 1/2 - 35 1/4	Railway Spring, com.	26 1/2 - 26 3/4
Am. Can, pref.....	92 - 94 1/2	Republic, com.....	24 1/2 - 25 1/2
Am. Car & Fdy., com.	45 1/4 - 47	Republic, pref.....	87 1/2 - 89 1/2
Am. Car & Fdy., pref.....	113	Rumely Co., com.....	16 1/2 - 17 1/2
Am. Loco., com.....	32 1/4 - 34 1/4	Rumely Co., pref.....	39 - 39 1/4
Am. Loco., pref.....	99 1/2 - 101	Sloss, com.....	27 1/2 - 29
Am. Steel Foundries	29 - 30	Sloss, pref.....	91
Bald. Loco., com.....	44 - 45	Pipe, pref.....	48 - 49
Bald. Loco., pref.....	104	U. S. Steel, com.....	61 - 65 1/4
Beth. Steel, com.....	35 - 36 1/4	U. S. Steel, pref.....	107 1/4 - 108 1/2
Beth. Steel, pref.....	71 1/2 - 74	Va. I. C. & Coke.....	40
Case (J. I.), pref.....	98	Westinghouse Elec.	63 1/2 - 65 1/2
Colorado Fuel.....	31 1/4 - 33 1/4	Am. Ship, pref.....	97 1/2
Deere & Co., pref.....	94 1/2 - 95	Chic. Pneu. Tool.....	50 - 52 1/2
General Electric.....	140 1/4 - 142 1/4	Cambria Steel.....	46 - 47 1/4
Gr. N. Ore Cert.....	35 - 36 1/2	Lake Sup. Corp.....	23 1/2 - 25 1/2
Int. Harv., com.....	107 1/2 - 109	Pa. Steel, pref.....	64 1/2 - 64 3/4
Int. Harv., Corp.....	106 1/2 - 108	Warwick.....	10 - 10 1/2
Lackawanna Steel.....	37 1/2	Crucible Steel, com.	15 1/4 - 15 3/4
Nat. En. & St., com.	13 1/2 - 14 1/2	Crucible Steel, pref.	93 - 94
Nat. En. & St., pref.	80 1/2 - 81	La Belle Iron, com.....	47 1/2
Pittsburgh Steel, pref.	94 1/2	La Belle Iron, pref.....	120 1/4
Pressed Steel, com..	24 1/2 - 25 1/4		

Dividends Declared

The Niles-Bement-Pond Company, regular quarterly, 1 1/2 per cent. on the preferred stock, payable August 14. The dividend on the common stock has again been passed in pursuance of the company's conservative policy, although the net profits for the last quarter were \$304,696, and after the deduction of \$75,861 for the preferred stock dividend and \$82,357, expenses to June 30 as a result of the floods at Hamilton, Ohio, a balance of \$146,478 was left. The common stock requirement is \$127,500.

The Pratt & Whitney Company, regular quarterly, 1 1/2 per cent. on the preferred stock, payable August 15.

The American Steel Foundries, regular quarterly, 1/2 of 1 per cent., payable September 30.

The Studebaker Corporation, regular quarterly, 1 3/4 per cent. on the preferred stock, payable September 1.

The Canadian Car & Foundry Company, regular quarterly, 1 3/4 per cent. on the preferred stock, payable October 25.

The Hoevet Mfg. Company, recently incorporated, and whose office is located at 105-109 Hudson street, New York, has taken over the business formerly owned and conducted by A. T. Hoevet at 422 West Forty-sixth street. The company has secured a larger factory at 390 Eleventh avenue, to take care of the present business and to provide facilities for increasing the output, now seen to be necessary. It is manufacturing metal novelties for several large novelty houses as well as others which it will market on its own account. It will also import. In addition to this, the company does general machine shop work and experimental, designing, die and pattern work. Alfred T. Hoevet is president; Arthur H. Jorns, vice-president, and Renard A. McKee, secretary and treasurer.

Foreclosure sale of the New York State Steel Company's plant and other property at Buffalo and in Minnesota is sought by the Commonwealth Trust Company, Buffalo, as trustee for the bondholders. A bill of complaint just filed in the United States Court states that the Steel company defaulted by failing to pay interest on \$3,850,000 of bonds issued in 1906. The suit of J. H. Hillman and others for \$8,111.09 for coke forced the company into receivers' hands in April. The receivers are F. Ernst Porter, Alfred L. Becker and Theodore H. Wickshire, Jr. Immediate sale is requested, and also that the plant should not be dismembered.

A desire to have increased representation in the International Association for Testing Materials was manifested in a meeting of the British section of the association at the offices of the Iron and Steel Institute, July 16. A committee of seven members, including Prof. W. C. Unwin, F. W. Harbord, G. C. Lloyd, Leslie Robertson and Dr. Walter Rosenhain, was appointed to report to a meeting to be held in the autumn on steps to be taken to increase membership. London Engineering, in commenting on the meeting, says: "It would certainly popularize British goods in foreign countries if they were more frequently standardized to international rules."

Personal

Willis L. King, vice-president Jones & Laughlin Steel Company, Pittsburgh, has sailed for Germany.

Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Mfg. Company, sailed August 9 for a five weeks' trip through Europe. He will look over the company's foreign subsidiaries and will sail from Liverpool for home September 11.

Among those who returned to the United States on Wednesday, August 6, from a tour of Europe, including participation in the visit to industrial Germany by the American Society of Mechanical Engineers, were the following: C. W. Bennett, assistant to the president of the American Sheet & Tin Plate Company, Pittsburgh; W. N. Best, oil furnaces and oil heating engineering, New York; George M. Bond, mechanical engineer, Hartford, Conn.; Willard C. Brinton, mechanical engineer, Bush Terminal Company, New York; W. A. Doble, chief engineer, Pelton Water Wheel Company, San Francisco; E. R. Fellows, Fellows Gear Shaper Company, Springfield, Vt.; Ad. K. Fischer, president, Schutte & Koerting Company, Philadelphia; A. C. Jackson, general superintendent, Miller Lock Company, Philadelphia; E. E. Keller, president, Detroit Insulated Wire Company, Detroit, Mich.; C. M. Lucas, Lucas Machine Tool Company, Cleveland; Senator Newell Sanders, Newell Sanders Plow Company, Chattanooga, Tenn.; H. A. Soverhill, vice-president, Root & Van Dervoort Engineering Company, East Moline, Ill.; Worcester R. Warner, president, Warner & Swasey Company, Cleveland, and John T. Wilkin, vice-president, Connersville Blower Company, Connersville, Ind.

William Kent, consulting engineer, New York, best known perhaps as author of Kent's Mechanical Engineer's Pocket Book, and Calvin W. Rice, secretary of the American Society of Mechanical Engineers, have been made chairman and secretary, respectively, of the technical section of the International Congress on Refrigeration, which is to be held in Chicago in September. There is to be a reception early in September in New York City to the visiting delegates arriving from other countries.

C. E. Sanders has severed his connection with the Janesville Machine Company, Janesville, Wis., to become general purchasing agent for the Emerson-Brantingham Company at Rockford, Ill. He was secretary of the National Plow Association for four years and had previously been connected with manufacturers of agricultural implements.

J. E. Barry, for 18 years connected with the sales organization of the Chicago Screw Company, has been appointed sales manager, effective July 1.

Thomas W. Henderson, president Henderson Motorcycle Company, of Detroit, Mich., was elected president of the National Association of Motorcycle Manufacturers at the annual meeting of that body held at Atlantic City, August 7.

Arthur Gifford, for many years active in the management of Gifford Brothers, and later treasurer of the Gifford-Wood Company, has severed his connection with the latter company. He has become connected with the Mechanical Handler Company, now building a plant for the manufacture of ice elevating and conveying machinery, at Hudson, N. Y., and the business will be under the direct management of Mr. Gifford and R. D. Van Valkenburgh. N. H. Williams, with offices at 565 West Washington street, Chicago, will handle the western business.

R. D. Van Valkenburgh has resigned as branch manager of the Colonial Steel Company, at 213 West Lake street, Chicago, to become treasurer and general manager of the Mechanical Handler Company, at Hudson, N. Y.

Comly B. Shoemaker, president Glasgow Iron Company, Pottstown, Pa., fractured a hip in a fall at the Reading Terminal, Philadelphia, August 9, and was taken to the Pennsylvania Hospital in that city. As he is 74 years old, much concern is felt as to the outcome of the accident.

Prof. Albert Sauveur, of Harvard University, whose work in the metallurgy of iron and steel, and particularly in metallography, has been widely recognized, has been awarded the Elliott Cresson gold medal, which is the highest honor bestowed by the Franklin Institute.

W. N. Crafts, president Crucible Steel Forge Company, Cleveland, Ohio, recently returned from Europe where he visited several plants producing steel by electricity.

W. Z. Ward has been placed in charge of the Pittsburgh office of the Pneumelectric Machine Company, Syracuse, N. Y.

E. H. Wuerdeman, formerly in the sales department of the American Rolling Mill Company, Middletown, Ohio, has been appointed factory manager, a newly created position.

Dr. Winthrop Talbot has opened an office in the Woolworth Building (Room 2289), New York, for consultation on industrial hygiene and works conditions.

Frank A. Moeschl, manager of sales of the Newport Rolling Mill Company and the Andrews Steel Company, Newport, Ky., is absent on a vacation trip that will be spent at an Eastern summer resort.

James D. Robertson, who two years ago left the Pittsburgh Valve, Foundry & Construction Company to go with the Pittsburgh Piping & Equipment Company, and later organized the Warren Tool & Forge Company and built its new plant at Warren, Ohio, has again returned to the Pittsburgh Valve, Foundry & Construction Company, becoming second vice-president.

Steel Ties in Europe.—A recent traveler in Europe was struck with the fact that the steel tie, which has made very little headway in the United States, is extensively used abroad, and particularly in Germany, where only two years ago the Prussian State Railways alone purchased over 150,000 tons of such ties. On the fine stretch of road between Berlin and Hamburg, the steel-tie track was of excellent quality, both as regards the surface and alignment; contrary to the general impression, the track was not noisy, but was really more silent than some stretches of good track laid on wooden ties. It should be said, however, that the German locomotives and cars are much lighter than those in the United States.

The Peden Iron & Steel Company has now under way at San Antonio, Texas, a fireproof building, 329 ft. long, which will cost when completed about \$120,000. It is constructed of steel reinforced concrete, with a large office and display room, the latest improved electric elevators and a fire sprinkling system throughout the building. A private track runs the full length of the property, which covers about five acres. The contracts have all been let for material, machinery, etc. The company has stores at both Houston and San Antonio and deals wholesale in mill and mining supplies, plumbers' supplies, general hardware, stoves, nails, wire, pipe, fittings, etc. C. M. Cain is local manager at San Antonio.

D. H. Burnham & Co., architects, of Chicago and New York City, will draw the plans for the new office building to be erected by the Youngstown Sheet & Tube Company at East Youngstown, Ohio. The new building will be three stories high and will contain the offices of C. S. Robinson, second vice-president; W. C. Reilly, general manager, and other officials, the pay and time departments, the drafting department and the clerical forces. The building will be of fireproof construction.

A process has been invented by Fritz Planther and Victor Dorn, Berlin, for coating metals with tin or lead. For tinning, clean the metal from rust, scale, or grease, then mix two pounds of tin powder and one pound zinc chloride to a paste with water or alcohol and spread over the metal. Heat until the tin melts, when the surface will be covered with tin. The same method applies to coating with lead, only powdered lead is substituted for tin. Ammonium chloride may be used instead of zinc chloride.

The Allis-Chalmers Mfg. Company, Milwaukee, has elected to come under the Wisconsin workmen's compensation or industrial insurance act. By this action 4,000 more employees are brought under the provisions of the law.

Obituary

Alfred A. Pope

Alfred Atmore Pope, of Farmington, Conn., and Cleveland, Ohio, died at his Farmington home August 5. He was born in North Vassalboro, Maine, in 1842, the son of John and Theodate (Stackpole) Pope, the name at that time being well known among the respected Quaker families of New England and Pennsylvania, as well as among the manufacturers of the period, whom the water power of New England had stimulated into activity. In his early boyhood the family moved to Salem, Ohio, his school days being spent in that Quaker town, and, a few years later, in Cleveland, Ohio, where Mr. Pope's business experience began. After five or six years as a partner in the woolen manufacturing business conducted by his father and brothers under the firm name of Alton Pope & Sons, in connection with the malleable iron business began in the year 1869. This became the leading commercial interest of his life and he, associated with the men who became his lifelong friends and partners, was foremost in



ALFRED A. POPE

developing the present process of making malleable iron and in extending its manufacture, until now it has become one of the important iron industries in the United States.

Rare patience, foresight, sound judgment, absolute justice, untiring devotion to detail and a gift for inspiring and rewarding the best efforts and stimulating the best qualities of other men were among the many striking elements of Mr. Pope's successful career. His remarkable personality impressed itself on all who met him. Under his inspiring leadership the Cleveland Malleable Iron Company rapidly grew in importance and reputation, and its operations extended in the course of years to other communities, resulting finally in the great group of the malleable iron and steel casting plants of the National Malleable Castings Company at Cleveland, Chicago, Indianapolis, Toledo, Sharon and Melrose Park.

The Eberhard Mfg. Company, of Cleveland, established in 1879, planned to produce light and special castings, has developed from small beginnings into one of the largest manufacturers of vehicle and saddlery hardware in the world. The Ewart Mfg. Company, of Chicago and Indianapolis, now a part of the Link-Belt Company, originator of detachable link belting, is another of the large enterprises which grew and developed under Mr. Pope's management.

At the time of his death Mr. Pope was president of the National Malleable Castings Company and the Eberhard Mfg. Company, which positions he had held since their organization. He was director in the Link-Belt Company, of Chicago, the North & Judd Mfg. Company and the Landers, Frary & Clark Company, of New Britain, Conn., the Indiana & Michigan Electric Company, of South Bend, Ind., the Colonial Trust Company, of Waterbury, Conn., and the Century Bank of New York. He was a member

of the advisory board of the Guardian Savings & Trust Company, Cleveland; trustee of Western Reserve University; president of Westover School, Middlebury, Conn.; member of the Royal Society of Fine Arts, London; member of the visitors' committee of the Fogg Museum of Fine Arts of Harvard University.

JACOB K. DIMMICK, once widely known as a cast-iron pipe maker and later prominent in the iron, coal and coke trade, died at the residence of his son in Wynnewood, Pa., August 9, aged 67 years. He was born in Philipsburg, N. J. After serving in the Civil War he became associated with the Addyston Pipe & Steel Company, Cincinnati, Ohio, and was connected with that concern nearly 25 years, a large part of the time being general manager. In 1889 he built the plant of the Radford Pipe & Foundry Company, Radford, Va., and served as general manager of the company for two years. He then became associated as vice-president and general manager with the Anniston Pipe & Foundry Company, Anniston, Ala., building the company's plant. On the formation of the American Pipe & Foundry Company, a consolidation of a number of Southern cast-iron pipe foundries, he became its vice-president. In 1900 he severed that connection and organized the firm of J. K. Dimmick & Co., Philadelphia, Pa., for the sale of iron, steel, coal and coke, which business was continued until some six months ago when it suffered financial reverses. Mr. Dimmick leaves a widow, a son, F. D. Dimmick, and a daughter. He was prominently identified with the Union League, the Art Club, and other organizations.

HARVEY B. CHESSE, SR., one of the oldest nail and tack manufacturers in Pittsburgh, died at his home in that city August 10, aged 70 years. He was born in Pittsburgh. At the outbreak of the Civil War he enlisted in Young's battery and served until the cessation of hostilities, then becoming identified with his father in the tack and nail business. At his father's death he became a partner in the business with his brothers, Henry and Walter Chess. He was a machine designer and engineer, having spent many years in the study and designing of special machinery for his own manufactures. He was an honorary member of the Engineers' Society of Western Pennsylvania. He leaves a widow and two sons, Harvey B., Jr., and Philip Sheridan Chess, both of Pittsburgh.

ISADORE VAN HUFFEL, Mishawaka, Ind., died August 4, aged 71 years. This is the first break in the membership of the Dodge Quarter-Century Club. Mr. Van Huffel had been in the employment of the Dodge Mfg. Company, manufacturer of power transmission machinery, for about 35 years and was one of the charter members of the organization. For almost a quarter of a century he had charge of the paint and oil department of the company. He came to this country 41 years ago from Belgium, where he was born, and had resided in Mishawaka ever since his arrival in the United States.

CHARLES H. NIEKAMP, president Beck & Corbitt Iron Company, St. Louis, died at his home in Jennings, a suburb of St. Louis, August 6, after three months' illness, aged 63 years. He engaged in the file manufacturing business there in 1873. Later it became the Globe File & Hardware Company, and was absorbed by the Beck & Corbitt Company in 1901. In 1905 Mr. Niekamp was made president. He leaves two sons and three daughters by his first wife and two sons and one daughter by his second wife, who also survives him.

NELSON J. CLAYTON, president Clayton-Lambert Mfg. Company, died at his residence in Detroit, Mich., August 8, following a long illness, aged 72 years. He had resided in Detroit about 50 years, where he was engaged in the manufacture of plumbers' supplies. He leaves a widow and daughter.

WILLIAM GLADDER, one of the early manufacturers of machinery in Chicago, died July 31, aged 57 years, following an operation at the Presbyterian Hospital in that city.

Japan has become a producer of galvanized sheets through the new Japanese Galvanizing Company at Osaka. There have been difficulties, due to the newness of the organization, but the product is reported to be well galvanized.

Pittsburgh and Vicinity Business Notes

Last week three of the eight 60-ton open-hearth furnaces in the new plant of the Pittsburgh Crucible Steel Company at Midland, Pa., were started. A fourth furnace will go on this week and it is expected that in about six weeks all the furnaces will be in operation. The new 42-in. blooming mill and the billet mill built by the Morgan Engineering Company are also going. The company will use a good part of the output in its own finishing mills, but will be a seller of 4-in. and larger billets and slabs in the open market. The engine equipment was furnished by Mackintosh, Hemphill & Co., Pittsburgh.

The strike of the puddlers at the plant of the Sligo Iron & Steel Company, South Connellsville, Pa., was settled last week, the men returning on the company's terms.

The Forged Steel Wheel Company, Frick Building, Pittsburgh, has placed orders for its works at Butler, Pa., with the General Electric Company for three 1000-kw turbo-generator sets, and with the Alberger Pump & Condenser Company, New York City, for condensing apparatus and cooling towers.

The Crucible Steel Company of America, Pittsburgh, is taking estimates on the installation of water-tube boilers to be operated by automatic stokers, to displace 14 hand-fired boilers in the power plant of its LaBelle steel works.

The Pittsburgh Reinforced Brazing & Machinery Company, Pittsburgh, has filed notice of an increase in its capital stock from \$100,000 to \$115,000.

The eighth annual convention of the International Association for the Prevention of Smoke will be held in Pittsburgh September 9 to 12, inclusive. Headquarters will be in the Fort Pitt Hotel. The members will visit a number of the more important manufacturing plants in Pittsburgh, including the Homestead Steel Works and the plant of the Westinghouse Electric & Mfg. Company.

The Blaw Steel Construction Company, Pittsburgh, Pa., announces the removal of its general offices, which have been in the Westinghouse Building, Pittsburgh, to the new office building located at the company's works at Hoboken, Pa., on the West Penn Division of the Pennsylvania Railroad. The establishment is also announced of a Pittsburgh city sales office in room 621, Farmers' Bank Building.

In *The Iron Age* of June 12 mention was made of the relining of one of the Carrie furnaces of the Carnegie Steel Company in 39 days, which was a record up to that time. This has been beaten at the Lucy furnaces of the same company. On July 5, at 7 p. m., No. 2 Lucy furnace was blown out, all the lining and the salamander were removed, and the furnace was completely relined and blown in again on Tuesday, August 12, at 7 a. m., only 37½ days being required to do the work. The furnace is a thick-lined stack on the upper jacket, the bosh plates being within 30 ft. of the top. This makes the record for relining the more remarkable. The stack is 20 ft. 6 in. in diameter at the bosh and 90 ft. high. It has a capacity of about 450 tons per day, and was blown in on Bessemer iron.

In one day recently, there was turned out at the Farrell open-hearth plant of the Carnegie Steel Company 10,900 tons of sheet bars, a record for that works.

The Atlas Welding & Supply Company, Pittsburgh, has been incorporated with a capital stock of \$25,000 to do a general business of welding and brazing of all kinds.

The report that the sheet mills in the plant of the Follansbee Brothers Company, Follansbee, W. Va., had been closed for an indefinite period is untrue. The four sheet mills were recently closed for a few days for needed repairs, but at present the open-hearth steel plant, the sheet-bar mill, six hot tin mills and four sheet mills are running full, and with plenty of orders ahead.

The navy increases of Great Britain were rather impressively set forth in the estimates introduced in the House of Commons on July 17. "We are," it is explained, "due to receive a torpedo-boat destroyer on the average of once a week for the next nine months. During the next 12 months we shall receive on the average a light cruiser every 30 days, and during the next 18 months we shall on the average receive a super-Dreadnought of the latest possible type and of the highest possible cost every 45 days." Incidentally, it is held that the age of oil firing has come, and that destroyers, cruisers and battleships are all being ordered for oil firing only.

Large Order for Bronze Castings

Paul S. Reeves & Co., 1415 to 1425 Catharine street, Philadelphia, Pa., have just been awarded by the Commissioners of the Board of Water Supply, New York City, contract No. 70 for finished bronze valves aggregating 680,000 lb. of bronze, steel and iron. Of this total, 600,000 lb. is bronze, and Reeves & Co. claim that it constitutes the largest order for bronze castings ever placed by individual corporation, city or national government. The metal to be used is Reeves's manganese bronze.

The time specified in which to deliver this work is 22 weeks, but Reeves & Co. have scheduled the layout in their foundry on a 52-weeks basis and this without curtailing or interfering with their regular line of work. This has been made possible by the policy adopted by the company the first of the year to instal improved facilities in its several departments. The molding department includes a re-arranged and enlarged core oven, more floor room, new core room, compressed air service, pneumatic rammers, a 15-ton electric traveler, more flask storage, etc. These improvements, which were under way, will be pushed with added vigor owing to the award of this large contract.

Quick Delivery of Large Valves

In the last week in July a serious explosion occurred in the gas blowing engine house at the Ohio works of the Carnegie Steel Company at Youngstown, Ohio, which put it out of commission for the time being, and necessitated quick work in the matter of getting some new equipment to start it again. On Saturday, July 26, at noon, the Carnegie Company placed an order with the Pittsburgh Valve, Foundry & Construction Company, Pittsburgh, for four 28-in. and three 48-in. valves for air piping purposes, with the request that work on them be rushed to the limit. The Valve Company did not have anything in stock but the patterns but got to work at once, and on Thursday, July 31, it shipped two of the 28-in. and one of the 48-in. valves by special train, consisting of an engine and one car, from its works to Youngstown, and on Friday, August 1, a shipment was also made by special train of the other two 28-in. and two 48-in. valves. These valves are of special design, and the quickness with which they were made and delivered can be regarded as quite an achievement.

The Woodward Iron Company, Woodward, Ala., is installing three turbo blowers, built by the General Electric Company. These machines will each have a capacity of 60,000 ft. of air per min. against a maximum pressure of 30 lb. They are said to be the largest blowing units in the world. One is intended for each of the two old furnaces at Woodward and one for the new furnace just completed. The company is also installing at the new furnace a pig breaking machine for handling the sand cast pig, and not a pig casting machine, as erroneously reported. This machine is built on the same principle as a shear and is designed to break 60 tons of iron per hour.

The J. I. Case Threshing Machine Company, Racine, Wis., won nine out of a possible ten gold medals in the international tractor contest held recently at Winnipeg, Man., under direction of the government of the Dominion of Canada. The company won three first prizes in the steam engine division, four in the internal-combustion engine competition and two in the gang plow division. A 110-hp. Case steam tractor broke the world's record for fuel economy, requiring but 2.65 lb. of coal per hp.

A receiver has been appointed for the Leetonia Steel Company, organized some months ago to build an open-hearth steel plant and sheet mills at Leetonia, Ohio. This action has been made necessary by the failure of the First-Second National Bank, Pittsburgh. Work was at once stopped on the new plant, but it is now stated that the company expects to make arrangements with other parties to float its bond issue; if successful, construction will be resumed.

Coal for the use of state and private railroads is to be admitted into Russia free of duty, according to recent action by the Duma.

Book Reviews

Dictionary of Automobile Terms. By Albert L. Clough. Pages 357, 5½ x 8½ in. Published by the Horseless Age Company, New York. Price \$2.

The rapid development of the automobile industry has given rise to the use of many technical and trade terms; a large number of words has been coined also. This book arranges alphabetically this mass of terms and defines them concisely. Many of the definitions are illustrated. The author is associate editor of the Horseless Age.

The Catskill Water Supply of New York City. By Lazarus White. Pages xxxii + 748, 6¼ x 9¼ in. Published by John Wiley & Sons, Inc., New York. Price \$6.

The history and description of every great engineering achievement may well be preserved in permanent form. This excellent work goes minutely into the latest of New York City's engineering undertakings—one that ranks with the Panama Canal in the difficult problems to be solved, and that in some of its aspects is scarcely less interesting. The aim of the author, who is a division engineer of the board of water supply, has been to present the matter in a reliable and readable form, so as to give in the compass of a work not too long an adequate idea of the history, location, design and construction of the Catskill water supply. Mr. White has been connected with the work from almost its inception to the present time and thus speaks with authority. There are 20 chapters, dealing first with the history and then with the successive stages of the work, the last two devoted to the city tunnel and the stupendous task of blasting a water channel in nearly every section of the city. There are 239 plates, some of them maps and others giving views of steel and concrete construction. Some 78 tables are given and at the end of the book a list of published articles dealing with the project. The book is highly interesting to the general reader as well as to the engineer and engineering student.

Lake Superior Iron Ore Annual. Compiled by the Iron Trade Review. Pages 71, 6 x 9 in. Published by the Penton Publishing Company, Cleveland, Ohio. Price \$2.

This volume is the successor to the chart of Lake Superior iron ore production by mines which has been published for a number of years. It gives shipments by mines, ranges and ports for 1912 and previous years, together with prices and other statistics bearing on the Lake Superior iron ore movement and market. Edwin C. Eckel contributes several pages on "Ore Mining Costs in the Lake District." Tables of average iron content of shipments from the different ranges in the years beginning with 1902 are given, as compiled by W. L. Tinker, secretary of the Lake Superior Iron Ore Association. These show that the decline in the iron content of Lake ores, that had been going on for nearly 10 years, was checked in the past two years, and that there was a slight increase in average iron content on most ranges in 1912.

The New Competition. By Arthur Jerome Eddy. Pages 379, 5½ x 8¼ in. Published by A. C. McClurg & Co., Chicago and New York. Price, \$1.50.

This is a second edition of the book, the first having been under the imprint of D. Appleton & Company. Mr. Eddy's ideas, commented on in an editorial in *The Iron Age* of June 6, 1913, would seem too advanced for every day service were it not that the Bridge Builders' Society, of which the author is the legal advisor, is conducted directly along the lines outlined in the book. The average reader is apt to be still skeptical concerning the application of Mr. Eddy's views to dissimilar lines of industry. The parts of the book devoted to advancement in the relations of contractors to each other and to the public are original, forcefully stated, and apparently practical. In connection with the trust and labor problems, the ideas advanced embody the now widely held considerations of publicity and regulation, with entire responsibility upon industry for physical injuries and old-age disability. Appended are chapters on conditions in Canada, England, and Germany.

British Steel Agreements Threatened

The recent reductions in prices of plates, shapes and bars in Great Britain and the reports of disagreements in the associations of steel makers have made calculations as to the immediate course of the market very difficult. The Associated Steel Makers, at a meeting held in London late in July, formally decided not to reduce angles and plates, but the reductions have come later, and are from \$2.50 to \$3 a ton. The Associated Joist Makers made a reduction of 10s. a ton and Staffordshire marked bars have declined by an equal amount. The Scottish Association is confronted by a serious situation created by the reported resignations of two companies, while a third has expressed dissatisfaction with the rebate system. This was put into effect nearly two years ago, with a view to holding the trade of British consumers of plates and shapes and preventing further inroads by continental steel makers. Strong efforts are being made to hold the association, but the outcome is uncertain. The Iron and Coal Trades Review of August 1 has this comment on the situation:

"In order that associations of this character may hold together, it is, of course, essential that they should embrace practically the whole of the trade, and with the exception of certain firms in South Wales this has been the position of the associated makers of Scotland, the North-East Coast and the Midlands. In the past, however, it has always been difficult to hold price associations together in times of falling prices, and the possible break-up of the Scottish Association might easily foreshadow the break-up of the other associations which work in co-operation together. We understand that the meetings which were held were continued until a late hour, and it is believed that matters will be adjusted before the time arrives for the notices of resignation to take effect."

Lake Superior Mining Institute

Announcement is made by the secretary, A. J. Yungbluth, Ishpeming, Mich., of the preliminary program of the eighteenth annual meeting of the Lake Superior Mining Institute, which will be held on the Mesaba range, Tuesday, August 26, to Saturday, August 30. Headquarters will be at Duluth. The members will be taken by boat to the Minnesota Steel Company's plant at West Duluth, Tuesday afternoon. Special trains leave for the Mesaba range Tuesday midnight. Mines between Biwabik and Virginia will be visited Wednesday and a business session will be held at Virginia Wednesday evening. Mines between Virginia and Hibbing will be visited Thursday, with social meeting at Hibbing in the evening. Mines on the west end of the range will be visited Friday and the business session in the evening will be at Coleraine. The concentrating plant at Coleraine will be visited Saturday. The papers thus far arranged for are as follows:

Sanitation for Mine Locations. By W. H. Moulton.
Re-Lining No. 2 Hamilton Shaft with Reinforced Concrete Dividers, End Plates and Poured Concrete Walls. By S. W. Tarr, Duluth.
Mine Laws, Special Rules and Accidents. By E. B. Wilson.
Winona Stamp Mill. By R. R. Seeber.
Mining Methods on the Mesaba Range. By Willard Bayliss, J. S. Lutes, E. D. McNeil, committee.
What Our Neighbors Can Do in Mining Iron Ore. By D. E. Woodbridge.
Safety in the Mines of the Lake Superior Iron Ranges. By Edwin Higgins.
Ore Washing Plant at Coleraine. By John Uno Sebenius.
Hoist Efficiency. By F. H. Armstrong.
Electricity. By William Kelly.

The committee on the Practice for the Prevention of Accidents will make a report. Officers will be elected at this meeting. Pentecost Mitchell is president of the institute.

Pennsylvania Steel Company's Railroad Sold.—The Public Service Commission of Maryland has approved the acquisition of the Pennsylvania Steel Company's Baltimore & Sparrows Point Railroad by the Philadelphia, Baltimore & Washington Railroad Company. The line is 5½ miles long, connecting with the P., B. & W. at Colgate Creek, through the Union Railroad Company, and is capitalized at \$150,000. It was built to connect the works of the Maryland Steel Company with the Union Railroad and the Northern Central. The sale is in line with the decision of the Pennsylvania Steel Company to dispose of its railroad property. A sale of its interest in the Cornwall & Lebanon Railroad in Pennsylvania was made some time ago.

Visit to Humboldt Engineering Works, Cologne

One of the interesting engineering manufacturing establishments of Germany which was visited by the party of the American Society of Mechanical Engineers recently touring Germany, was that of the Humboldt Works in Kalk, a suburb of Cologne, a short distance across the Rhine from Cologne. The works are remarkable for the wide range of products manufactured, including ore treating machinery, steam engines, steam boilers, water softeners, steam turbines, steel structures for buildings and bridges, locomotives and ice and refrigerating machinery. One reason given in explanation of the wide range of manufacture is that it early became the specialty of the Humboldt Works to manufacture plants in their entirety, so that from supplying at first apparatus for dressing ore, it went into the business of providing mine pumping machinery and finally of erecting entire plants, including such industries as cement manufacture. On the occasion of the visit, which occurred July 2, an address was made to the visitors and some figures were contributed regarding the capitalization and operation of the works.

At the present time, the Humboldt Works employs about 5200 operatives and employees, including 110 agents distributed over the globe, but not including the staff members of the agents. The company is capitalized at \$5,000,000, and at the time of the visit had outstanding loans to the amount of about \$2,500,000. The annual volume of business or turn-over amounts to \$7,000,000, and the expenditure for materials is \$3,000,000; that for salary \$500,000; that for wages \$1,825,000. The amount set aside for amortization is \$350,000, and the profit named is \$900,000. The total production for the year is given as 60,000 tons. Under German law, the so-called social charges, for the benefit of employees, amounts to about \$17.50 per head, or a total, according to an example worked out for the benefit of the visitors, of 17 per cent. on dividends. The distribution of the social charge expenditure is as follows: For accident insurance, \$5 per head; sick fund, \$4; invalids' insurance, \$2.50; voluntary payments, \$6, or a total of \$17.50.

The Humboldt Works were founded 57 years ago and naturally represent a colony of buildings added from time to time. Its wide variety of output is distributed wherever a sale can be made and includes, as stated, even ice and refrigerating machinery, into which manufacture the company was led through the occasional desirability of freezing methods in driving tunnels in underground work. It has however equipped hotels with refrigerating apparatus, and it has concerned itself with hygienic problems of municipalities, installing also refuse destructing plants. The whole aspect of the Humboldt plant is one given over to special work, and there is now a grouping of the shops into six different departments and each shop is operated independently of the others. Each department has its own chief engineer and foreman. At the visit, it was admitted that Germans generally have not yet learned to order standard types of apparatus and the Humboldt Works recognizes the common preference of the buyer to have a given machine built in accordance with a particular fancy.

In a necessarily brief visit to a plant occupying some 80 acres, it is not possible to collect very much information likely to be of definite and immediate interest to American institutions. Recognizing the difficulties, however, the officials divided the visitors into small groups, each with a group guide to make explanations and to answer questions and with a member of the workmen's fire fighting brigade in uniform. The arrangement was admirable, as the representative of the works fire department carried a standard with one of the group numbers, so that one beginning with a definite group could always find his group center, although this standard carrier saw to it that all members of his group stayed together. By dividing the duties of guiding and leading between two persons, the guide's attention was not diverted by frequently ascertaining whether all the members of his group were still with him, and the arrangement had the further advantage that if one of the party tarried to see some particular detail, he readily found his group, if indeed the fireman-leader did not watch to see that he was brought back into the group. As usual also in keeping in mind the time element of the visit, the itinerary of the visitors through the plant had been carefully studied and the time of transit was watched so

that plenty of time could be available for the luncheon which as stated already in these columns in references to the American tour of Germany, was always a leading feature.

In connection with the fire department, there is also a hospital for the works. In the yards of the works, which were quite generally of a decidedly neat appearance, an arrangement of storing plates on edge was noted, held between a framework of channel shapes and spanned by traveling gantry cranes. The bins, used for scrap materials of various kinds, were generally of concrete, with walls perhaps 6 in. thick and about a yard high. The main doors to the buildings carry little window openings about 6 in. square, sometimes with a glass plate both inside and outside, so that the watchman going his rounds may readily see the interior and ascertain the imminence of fires.

For threading holes in locomotive fire boxes, interesting portable outfits were employed. These are electrically driven, and the motor is placed by the traveling crane on top of the locomotive boiler. The extended electric motor shaft is counter weighted to carry the drilling tool, which is suspended opposite the sides of the boiler and the driving between motor and tool is accomplished by what corresponds to flexible tubing or light shafting connected by universal joints. In the foundry, large flasks are commonly carried by a bar with hoisting eye in the middle for lifting by the crane. The flask is suspended from opposite ends of the bar, but this bar is serrated or provided with a series of equally spaced notches for taking the lifting link from each end of the flask. The notches are numbered consecutively in opposite directions from the central point so that the workman can readily note whether he has the flask properly balanced by placing the links in the notches of the right number. Another detail noted was the machine perforation of steel plates 1 in. thick having a tensile strength of about 85,000 lb. per sq. in.

General Electric Apparatus for Steel Mills

The General Electric Company, Schenectady, N. Y., furnishes the following report of recent sales of its apparatus for use in steel plants: The Leetonia Steel Company, Leetonia, Ohio, a 3125-kva. Curtis turbo-generator, with 35-kw. turbo-exciter, a 500-kw. motor-generator, one 30-hp. and seven 40-hp. motors with magnetic controllers, two 60-hp. motors, a 1500-hp. induction motor and accessories. The Republic Iron & Steel Company, Youngstown, Ohio, a 3125-kva. Curtis turbo-generator, with 35-kw. turbo-exciter, switchboard and accessories. The Maryland Steel Company, Sparrow's Point, Md., two 150-hp. and three 450-hp. induction motors, with controllers and switchboard. The Union Rolling Mills Company, Cleveland, Ohio, 300-hp. and 500-hp. induction motors, a regulating set, two 4000-kva. transformers, switchboard and accessories. The Pennsylvania Steel Company, Steelton, Pa., a 3125-kva. Curtis turbo-generator. The Allegheny Steel Company, Brackenridge, Pa., a 1000-kw. Curtis turbo-generator, with two switchboards and accessories. The Bethlehem Steel Company, South Bethlehem, Pa., a 300-hp. two-unit, three-bearing motor-generator set and four switchboards.

The Columbus Mill & Mine Supply Company, Columbus, Ohio, will add steel bars, structural steel shapes and plates to products it carries in stock. The company is building a large new warehouse, and yards and switch tracks are being laid out. Equipment for handling plates, shapes and other heavy materials is being installed. The new building will be ready about September 1, and all its initial stocks will come from the Cambria Steel Company, Johnstown, Pa., which makes a full line of the above-named products.

The National Steel Products Company, Marquette Building, Chicago, incorporated in Illinois with a capital of \$350,000, and manufacturer of the Allen nut lock and J & J staybolt, has purchased the real estate and buildings at Hobart, Ind., formerly occupied by the Makutchan Roller Bearing Company. As soon as the necessary machinery can be secured and installed, the plant will be placed in operation.

The British Copper Market

The following statement of conditions in the British copper market in the last week in July is taken from the circular of Henry R. Merton & Co., Ltd., London, dated July 26:

The improvement in the copper situation which started toward the middle of last week has brought with it an outburst of activity in the entire copper trade, such as has not been witnessed in many months. It was to be expected that with the return of some confidence, and with prices at a reasonable level, manufacturers would avail themselves of the opportunity to replenish their exhausted supplies. The avidity with which, however, the whole industry purchased the metal must have surprised a good many people, not the least of them the producers themselves, who were inundated with orders to such a degree that they found themselves forced to advance prices from day to day, and finally some of them even decided to withdraw from the market altogether. We estimate the quantity of refined copper which has passed from producers' hands during the last 10 days at something like 10,000 tons. Seeing that the total stock of refined copper in the United States on July 1 amounted to 23,000 tons, it is obvious that a good proportion of the prospective output has already been disposed of. These developments strikingly confirm the views which we have expressed as to the ability of the copper industry to take care of the current production, enormous though it be.

In view of the small reserve stocks now in existence and the large consumption still proceeding, the possibility of a temporary scarcity of the metal has again become a question for practical discussion. Such possibility is at this very moment confronting us. Scarcely have the labor troubles at the Nichols refinery been settled, when news of a far more serious character comes to hand from the Lake Superior district, where a strike of the copper miners has broken out, and all the mines have closed down. The annual production of copper in this district being over 100,000 tons, and the attitude of both sides of the dispute being reported as very determined and likely to lead to a prolonged struggle, the situation must be considered as very grave. No wonder it has had a startling effect upon the market, which is now in a state of great excitement, with prices rising sharply.

Convention of Trade Press Associations

President H. M. Swetland, of the Federation of Trade Press Associations in the United States, announces the completion of the programme for the eighth annual convention at the Hotel Astor, New York, September 18 to 20. Sixty speakers, including many of national reputation in the manufacturing, selling, advertising and publishing fields, have accepted invitations to address the convention and its sections. Fifty 10-minute addresses are scheduled for the editorial, circulation, advertising and publishing symposiums on questions affecting all who have dealings with the business press of the country. Other features of the convention will be an exhibit of successful technical and trade journal advertising campaigns, a great business meeting at which will be told the stories of the development of the leading publications represented, and an inspirational mass meeting with addresses by representative business and professional men. W. H. Ukers, 79 Wall street, New York, is chairman of the committee on arrangements.

American Rolling Mill Improvements

The American Rolling Mill Company, Middletown, Ohio, has let contract for extensions to its Central Works that will enable it to take care of a number of new specialties manufactured from American Ingot Iron. Among these are a patented metal shingle and a fence post.

The proposed extension to one of the factory department buildings will be 200 x 482 ft., one story, of saw-tooth roof construction. The building formerly occupied by the galvanizing department, which is 60 x 425 ft., one story, will be used for manufacturing and storage purposes. The galvanizing department has been recently moved to the East Works. The company has only recently finished a one-story building, 50 x 100 ft., that is used for the manufacture of tanks.

United States Coal Production in 1912

Increased 400 Per Cent. in a Generation
—Record-breaking Figures for 1912

The production of coal in 1912 reached the great total of 534,466,580 net tons, valued at the mines at \$695,606,071, according to a statement by Edward W. Parker, coal statistician, just issued by the United States Geological Survey.

This year the report on the coal industry of the United States begins the fourth decade in which coal statistics have been published annually by the Geological Survey. In 1882, the first year of this period, the total coal production of the United States had reached what was then considered about high-water mark—103,551,189 net tons. In 1912 the production of bituminous coal alone in the State of Pennsylvania exceeded that figure by nearly 60 per cent. and the combined production of bituminous coal and anthracite in Pennsylvania in 1912 was 2¼ times the total production of the United States in 1882. The total coal production of the United States in 1912 was more than five times that of 1882.

In 1882 the United States was a poor second among the coal-producing countries of the world, Great Britain having an output exceeding that of this country by nearly 70 per cent. The United States supplanted Great Britain as the premier coal-producing country in 1899, and in 1912 it was as far ahead of Great Britain as that country was ahead of the United States in 1882. The United States at present is contributing 40 per cent. of the world's supply of coal and is consuming over 99 per cent. of its own production.

All Records Broken in 1912

In 1912 the production of coal in the United States not only surpassed all previous tonnage records, but the average value per ton exceeded that of any normal year in the 33 years for which statistics are available. There has been only one year when prices generally were higher than in 1912, and that was 1903, the year of the fuel famine.

The gain in output in 1912 over 1911 was 38,095,454 net tons and the increase in value was \$69,040,860. The production of bituminous coal increased from 405,907,059 net tons to 450,104,982 tons, a gain of 44,197,923 tons, with an increase of \$66,607,626 in value. The decreased production of anthracite, amounting to 6,102,469 net tons, was due entirely to the suspension of mining in April and May, when practically the entire region was idle. The factors which contributed to the increased output of bituminous coal were (1) the revival in the iron and steel industry, which stimulated production in the Eastern States, the coal made into coke showing, alone, an increase of nearly 6,000,000 tons; (2) bumper crops of grain and other agricultural products, which gave prosperity to the farming communities of the Middle West; (3) decreasing supplies of natural gas and fuel oil in the Mid-Continent field and their consequent lessened competition with coal from the South-western States; (4) increased consumption by railroads and in nearly all lines of manufacturing; (5) activity in the mining and smelting of the precious and semi-precious metals in the Rocky Mountain and Pacific States. These factors combined made the year 1912 one of the rather rare prosperous years in the mining of bituminous coal.

Increased Production in 21 States

Of the 27 States in which coal mining may be considered to be conducted on a commercial basis, there were 21 in which the output of 1912 showed an increase over 1911, and in all but two of the important States the increase in value was greater than the increase in tonnage.

In the production of bituminous coal Pennsylvania in 1912 showed an increase of 17,304,231 net tons. West Virginia's increase in 1912 was 6,955,107 tons. Illinois increased its production by 6,206,108 tons, Ohio by 3,768,741 tons, Kentucky by 2,440,818 tons, Indiana by 1,084,363 tons, Alabama by 1,079,179 tons, Virginia by 981,971 tons, Colorado by 820,441 tons, and Kansas by 807,454 tons.

The blast furnace of the Perry Iron Company, Erie, Pa., was blown in on Monday, August 11, after being out about three months for relining and general repairs. The company states that no new equipment has been added, such as skip hoist, etc., as reported.

The Machinery Markets

Continued encouragement is generally reported. Business in New York is ahead of last year at this time, and prospects are considered good. Activity in all lines, but especially in power-plant equipment, prevails in the Detroit market. The aggregate volume of transactions at Chicago remains rather below normal owing to a reduced amount of plant extensions. No immediate hope for the ending of the Cincinnati steel strike is held out, though the teamsters' strike seems nearer settlement. Three machine-tool builders have been obliged to shut down and others forced to curtail operations because of the lack of castings resulting from the molders' strike. Most Cincinnati manufacturers have not been greatly handicapped as yet by the labor troubles, since they have been able to attend to old orders and new business has been somewhat slack. Expecting that the strike will be settled before the fall season begins, manufacturers are inclined to take a cheerful view of the situation. The tool business in Milwaukee has somewhat improved and good milling machine purchases for automobile manufacturers and part makers have come to the dealers. St. Louis has suffered to some extent from unfavorable corn crop conditions, though improvement in business is confidently expected. August is bringing excellent business in all lines to the manufacturers and dealers in the Louisville district, with ice-making equipment in decided demand. Sales are at least normal in Birmingham and inquiries presage good fall and winter conditions. Unusual municipal purchases are anticipated in Texas this fall and improved cotton prospects lend strength to hopes for activity. Pacific coast dealers planning to handle a larger number of orders, are replenishing their stocks. Considerable Government business is being figured on. A molders' strike has affected seven foundries in Toronto, but serious trouble is not anticipated. The owners believe they have the difficulties well in hand.

New York

NEW YORK, August 13, 1913.

Business is more satisfactory than in August of last year. The improvement reported last week is still held and prospects for fall business are encouraging. A fair number of pending deals promise to close as soon as the vacation season is over. Lathes have been in steady demand, though, as has been true in other lines; no large single orders have been reported. The Central Railroad of New Jersey has recently purchased some hydraulic equipment for its Elizabethport shops. This was a replacement order.

The Graphite Metalizing Company, Yonkers, N. Y., will build a two-story factory, 35 x 135 ft.

The Mechanical Handler Company, 601 Warren street, Hudson, N. Y., will build and equip a plant at Hudson for the manufacture of elevating and conveying machinery, utilizing a site of about four acres in area. The various departments will consist of pattern shop, foundry, forge shop, machine shop, shipping room, warehouse and office.

The Elmore Knitting Company, Oneonta, N. Y., is building a three-story and basement mill, 80 x 92 ft., of brick and structural steel.

Plans have been completed by H. C. Kittredge, engineer, Rochester, N. Y., for a waterworks system to be constructed at Marion, N. Y., including pumping station and storage reservoir.

The village of Lisle, N. Y., will build a waterworks system from plans of Gilmore & Cook, engineers, Binghamton, N. Y.

The city of Schenectady has awarded the general contract for construction of a pumping station to Pratt, Reed & Phillips, Waterford, N. Y., at \$230,000.

The Newfane Electric Company and the Newfane Basket Company, Newfane, N. Y., are having plans prepared for a power house to be constructed for the joint use of the two companies.

The village of Rye, N. Y., has plans in preparation for an incinerator plant for garbage disposal.

The Van Vechten Milling Company, Rochester, N. Y., is planning the construction of a four-story flour mill, 50 x 100 ft., which it will erect on Cliff street.

The electric lighting commissioners, Jamestown, N. Y., will purchase shortly for the electric lighting plant one 1000-kw, 60-cycle, 2400-volt turbo-generator with three stokers and switchboard panel. C. O. Johnson, superintendent of plant.

The village of Tuckahoe, N. Y., has plans in progress for construction of a garbage disposal plant. William Ruby is president of the board.

The Frazer & Jones Company will extend its foundry plant at Solvay, N. Y., by the building of an addition, 90 x 146 ft., and a wing, 100 x 160 ft. The Smith & Caffery Company has the contract for the structural steel.

Mare Island Navy Yard List

A list is out from the Bureau of Supplies and Accounts, Navy Department, Washington, for which bids will be received until September 16, schedule 5727, and for Mare Island, as follows:

- One universal double arbor bench saw.
- One hydraulic stanchion bender.
- One motor-driven radial drill.
- One motor-driven sensitive drill.
- Motor-driven upright drills.
- One hand-driven slip-roll former.
- One motor-driven combination grinder.
- One motor-driven plain cylinder grinder.
- Motor-driven emery tool grinders.
- One precision bench lathe.
- One flat turret lathe.
- One motor-driven engine lathe.
- One heavy motor-driven engine lathe.
- One motor-driven toolmaker's engine lathe.
- One motor-driven patternmaker's gap lathe.
- One motor-driven geared head lathe.
- One 18-in. x 10-ft. motor-driven geared head lathe.
- One motor head patternmaker's speed lathe.
- One motor-driven turning lathe.
- One toolroom lathe.
- 18-in. x 8-ft. motor-driven geared head lathes.
- Motor-driven bench lathes.
- One motor-driven combined band-saw, filing and setting machine.
- One horizontal boring, drilling and milling machine.
- One embossing machine.
- One 4-in. motor-driven centering machine.
- One motor-driven engraving machine.
- One motor-driven geared plate bending roll machine.
- One motor-driven metal planing machine.
- Two motor-driven milling machines.
- One motor-driven universal milling machine.
- One motor-driven pipe threading machine.
- One 10-in. motor-driven slotting machine.
- One motor-driven universal woodworking machine.
- One boring and turning mill.
- One motor-driven planer and jointer.
- One motor-driven open side planer.
- Arbor presses.
- One motor-driven double-ended punch and shear.
- One motor-driven cold metal saw.
- Motor-driven hack saws.
- One motor-driven back-geared crank shaper.
- Improved bench wood trimmers.
- One universal wood trimmer.

Plans have been completed for a reinforced concrete dye house, 108 x 257 ft., five stories, which will be erected by the Stephens, Sanford & Sons, Inc., Amsterdam, N. Y.

The Railway Products Company, Buffalo, has been incorporated with \$300,000 capital stock by Thomas B. Wheeler, Christopher M. Baldy, Gregory V. Harmon and Guy Williams, and will equip a plant.

The Erie Malleable Iron Works, Erie, Pa., has plans in preparation for a new foundry and annealing building, 120 x 200 ft., one story, which it will erect at an estimated cost of \$100,000.

Philadelphia

PHILADELPHIA, PA., August 11, 1913.

Scattered orders, almost entirely confined to single tools, are generally reported. Yet in the aggregate business represents a fair total for the season. However, buyers are taking, as a rule, only such equipment as is necessary and awaiting further developments in general business before going ahead with proposed important projects. Railroad purchases are few. Sellers of small tools and shop supplies report extremely dull business. The second-hand machinery market drags. Few inquiries for either new or second-hand equipment have been unimportant. Very few inquiries involve more than one or two tools and while some little business in small groups of tools is under negotiation, it closes slowly. Manufacturers of machinery and tools are fairly busy on old orders, but new business, except in certain specialties, is lighter. Deliveries on some Western tools are delayed on account of labor difficulties. Foundry operations continue fairly active, but business coming out is smaller.

Manning, Maxwell & Moore, machinery merchants, who for some years have maintained warerooms and made an extensive display of machine tools at 721-723 Arch street, Philadelphia, Pa., have discontinued the show rooms and opened business offices at 308 and 309 Metz Building, Broad street and South Penn square, Philadelphia. M. A. Sherritt is manager of the Philadelphia branch.

The Philadelphia Electric Company is planning extensive additions to its power equipment. The company supplies considerable power to the Philadelphia Rapid Transit Company, and is negotiating with the Pennsylvania Railroad to sell power for the electrification of its suburban main line system. The company is now planning to build a large substation at Sixty-fifth street and Paschall avenue, to distribute power in West Philadelphia, and Chester and Delaware counties. Its Christian street plant is to be increased by 88,000 hp. The work, it is expected, will be concluded by the close of 1914.

The plant of the Union Petroleum Company, Water and Mifflin streets, was almost entirely destroyed by fire August 7. The approximate loss has been placed at \$200,000. Adjacent to the oil works are the plants of the Homer Brass Works, and the crane plant of the Niles-Bement-Pond Company, at Mifflin and Meadow streets. Both of these plants suffered slightly from both fire and water, but this will not interfere with the regular operation of either plant.

H. H. Light, whose purchase of the equipment of the Canton Iron & Steel Company, Baltimore, Md., has been mentioned, advises that the transaction, which involved a portion of the machinery and old material, was made as a second-hand machinery purchase and that real estate was not involved.

The Robinia Locust Pin Company, which has been in operation at Newville, Pa., for several years, has removed to Shippensburg, Pa., where a new plant has been acquired. The equipment for the plant has been purchased.

Calvin J. Young, architect, Reading, Pa., is reported to be preparing plans for a light manufacturing building, to be erected in that city for the Hooen Mercantile Company, of New York.

The plant of the S. Flory Mfg. Company, Bangor, Pa., operating foundry and machine shops, was destroyed by fire August 1, with large loss on buildings and machinery. Plans for rebuilding are under way.

Koelie, Spaeth & Co., engineers, have plans prepared for a 5000-ton ice storage building, tank building, engine room and boiler house, to be erected for the Gloucester Ice Mfg. Company, Gloucester, N. J., whose plant was recently destroyed by fire.

The City Council of Gloucester City, N. J., will install an air lift system for pumping from wells at the city pumping station.

Plans are in preparation by F. W. Crane, engineer, Montclair, N. J., for a sewage disposal plant and sewerage system, to be installed for the town of Verona, N. J.

The National Enameling & Stamping Company, Baltimore, Md., has taken permits for the erection of a one-story boiler house, 20 x 40 ft., at Race and Ostend streets, in that city.

The Patapsco Iron Works, Inc., Baltimore, Md., is reported to be making a one-story addition, 40 x 40 ft., to its plant at Ostend and Wicomico streets, in that city. The building is to be of steel construction and will be used for general manufacturing.

New England

BOSTON, MASS., August 12, 1913.

Various reports indicate an improvement in general market conditions as they affect the metal industries. Some of the machine tool builders report sales slightly better and inquiries promising, though this comparison as applied to recent experience is not universal. The scrap metal market shows signs of life after a protracted stagnation. The wire industry is experiencing a seasonable awakening several weeks ahead of the usual time. Depressing conjecture as to the future is no longer commonly heard; encouragement as to what will come in the autumn has taken its place in many instances. The labor situation has improved. The boilermakers' strike is off in some cases, and the owners have made substantial gains in others. The B. F. Sturtevant Company and Becker Milling Machine Company, Hyde Park, continue to make gains. The strikers are making strenuous efforts, taking the form of demonstrations at the Massachusetts State House, to secure public hearings before the State Board of Arbitration, but they have been refused by that body.

The Traut & Hine Mfg. Company, New Britain, Conn., has purchased the business of the Cushman & Denison Company, New York, manufacturer of time-dating machines, and will transfer the factory to New Britain.

The Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., has brought out a 14-in. special taper turning lathe possessing a number of original features.

The Turner & Seymour Mfg. Company, Torrington, Conn., has increased its capital stock from \$250,000 to \$350,000, and the Silver Plate Cutlery Company, Shelton, Conn., from \$60,000 to \$80,000.

The sale by the receiver of the business of the American Shear & Knife Company, Hotchkissville, Conn., to Roswell A. Clark, Kansas City, Mo., has been approved by the court. Mr. Clark is president of the Clark Bros. Cutlery Company, Kansas City, which recently acquired the business of the Waterville Cutlery Company, Waterville, Conn.

The municipal electric lighting plant of Peabody, Mass., was destroyed by fire August 8. The engines and generators will be replaced.

The Central New Hampshire Power Company, a Maine corporation, is planning to develop 80,000 hp. of hydroelectric energy from New Hampshire streams, but the project may receive a check because a portion of the area includes the Appalachian reserve in Grafton County. A controversy has arisen between the state and federal authorities which doubtless will be threshed out in the courts.

The General Electric Company will erect a factory building at its Lynn, Mass., works, 79 x 142 ft., four stories.

Hachett & Witham, Skowhegan, Me., will rebuild a portion of their foundry which was recently destroyed by fire and will make improvements, including the installation of new equipment.

Chicago

CHICAGO, ILL., August 11, 1913.

Business has been running along with an aggregate volume rather below normal. With the exception of the list of tools issued some time ago by the Chicago & Northwestern Railway and the requirements of the Charles City Engine Works, Charles City, Iowa, for neither of which purchases have been made, there are no individual inquiries of importance. The demand for separate tools is rather light, in keeping with the generally reduced number of plant extensions that has been noticeable since the spring months.

Holmquist & Co., Chicago, have had plans drawn for a one and three story machine shop, dry kiln and boiler house to be erected at Thirty-fifth street and Maplewood avenue. The building will be 70 x 120 ft. and 100 x 120 ft.

The Crane Company, Chicago, will build a one-story brick factory, 34 x 80 ft., at 3321 South Canal street at a cost of \$4000.

The Wilcox Mfg. Company, 155 North Clark street, Chicago, has been incorporated to manufacture tools and general hardware. Bernard J. Mahoney, Arthur Daugherty and S. B. Wagner are the incorporators.

The General Chemical Company, Chicago, will build a one-story factory, 40 x 60 ft., at 120th street and Calumet River at a cost of \$7000.

Joseph Joyce, Chicago, is having built a three-story brick storage and manufacturing building, 66 x 102 ft., to

be located at 725 South Fifth avenue. It will cost \$110,000.

The Briggs Chicago Company, manufacturer of concrete dump carts and other concrete machinery, has moved into its new plant at North Chicago, Ill.

Barnhart Bros. & Spindler, Chicago, will occupy a two-story foundry, 197 x 236 ft., plans for which have been completed, to be erected at Monroe and Throop streets. The estimated cost of the plant is \$175,000.

The Empire Iron & Steel Company is having plans prepared for the erection of a three-story warehouse at Thirty-sixth and Morgan streets, Chicago, the cost of which will approximate \$90,000.

The Western Stoneware Company's plant at Macomb, Ill., was destroyed by fire July 31 with a loss of \$120,000. Definite plans have not been made for rebuilding.

The Wright Carriage Body Company, Moline, Ill., has let the contract to Axel Carlson for an addition to its works at a cost of \$5,000.

The Illinois Art Metal Company, Springfield, Ill., has been incorporated with a capital stock of \$20,000 to engage in the manufacture of metal products and in building construction. C. N. Posegate, G. D. Lockie and Charles A. Knox are the incorporators.

The Rock Island Bridge & Iron Company, Rock Island, Ill., has filed notice of an increase in its capital stock from \$30,000 to \$50,000 and of its board of directors from three to five.

The Goshen Lightning Rod Company, Goshen, Ind., will double its capacity this fall by erecting an addition to its plant.

The General Electric Company has purchased a site at Fort Wayne, Ind., and plans have been completed for the erection of a new factory building, the estimated cost of which is \$600,000. This does not include the cost of new machinery and equipment.

The plant of the Showalter Mfg. Company, maker of automobile bodies, Indianapolis, Ind., was destroyed by fire July 31 with an approximate loss of \$12,000.

Tell City, Ind., is considering the installation of a manual training department in the public schools. Address the board of education.

The Leonard Hi-Oven Range Company, Cedar Rapids, Iowa, has had plans prepared for the erection of a factory to have capacity for building 600 ranges annually. The plant is estimated to cost \$50,000. J. E. Leonard is president.

The Gade Bros. Mfg. Company, Iowa Falls, Iowa, will erect an addition to its plant, 50 x 300 ft., the construction and equipment of which will cost \$25,000. The company will build gasoline engines.

The plant of the Minnesota Box Company, St. Paul, Minn., was destroyed by fire July 31 with a loss estimated at \$50,000.

Cincinnati

CINCINNATI, OHIO, August 11, 1913.

No change has occurred in the strike situation here. The molders and foundry owners have apparently made no effort to get together, and it is openly stated by the latter that they will refuse to recognize the union. As a consequence several machine tool builders are somewhat embarrassed for a supply of castings, but thus far only three have shut down on this account. However, a number of shops have been compelled to lay off men. This has worked to a partial advantage in many instances, as new business has been somewhat slack. It is the general opinion that these labor troubles will be settled before the fall season begins, when orders for machine tools and all kinds of machinery will begin to come in. The teamsters' strike now seems nearer a settlement. Public sentiment runs strongly in favor of the employers, and employees in woodworking and other plants, as well as in mercantile establishments, who were necessarily laid off, are strong in their denunciation of outside labor agitators who have been the sole cause of the present trouble.

The G. A. Schacht Motor Truck Company, Cincinnati, has its new plant on Spring Grove avenue in full operation. Some extensions to its manufacturing facilities are planned, but no machinery equipment is needed just now.

The West Side Lumber Company, Dayton, Ohio, will rebuild that portion of its plant recently burned.

The Columbus Mill & Mine Supply Company, Columbus, Ohio, whose plans were recently mentioned, will have its new plant and yard ready for occupancy within the next 30 days. The company will add a complete line of structural material.

The municipality of Yellow Springs, Ohio, will soon

ask for bids on machinery necessary for a proposed addition to the electric lighting plant.

The proposed plant of the American Cash Register Company at Saginaw, Mich., will be 100 x 400 ft., one story, and of sawtooth roof construction. A power house will also be provided. As recently mentioned, the company expects to transfer its present plant at Columbus, Ohio, to Saginaw.

Work has commenced on the plant of the S. & M. Rubber Company, Coshocton, Ohio. Practically all of the necessary equipment has been purchased.

C. W. Breneman & Co., Cincinnati, have commenced work on a four-story factory building on Reading road to be used for the manufacture of window shades and other specialties.

A small machine shop will be operated by the Cincinnati Automobile Clearing House Company, recently incorporated. Robert Uricho and Samuel Bromley are named among the incorporators.

It is rumored that the Baldwin Piano Company, Cincinnati, contemplates some large additions to its plant on Gilbert avenue. The company recently increased its capital stock from \$60,000 to \$500,000.

The building to be erected for the Crucible Steel Company of America at Third and Elm streets, Cincinnati, will be 40 x 100 ft., two stories, and of brick construction. Gustav W. Drach was the architect who drew up the plans for the new structure.

The Valley Tannery Company, Cincinnati, will erect a two-story brick tannery at Gest and Hopkins streets.

The board of trustees of public affairs, Glendale, Ohio, will open bids August 18 for an air compressor and electric motor.

The Moline Plow Company has let contract for a four-story fireproof warehouse to be erected at Randolph and Front streets, Columbus, Ohio. The B. M. Freeman Company will superintend the construction of the building.

The Hardin-Wyandot Lighting Company, Kenton, Ohio, has had plans prepared for a new lighting plant that will be located on South High street.

It is reported that the Ralston Steel Car Company, Columbus, Ohio, will add to its manufacturing facilities. The company recently booked an order for 1000 steel cars from the Hocking Valley Railroad Company.

Larry Can, Clarksburg, W. Va., has purchased a site in Catlettsburg, Ky., and is planning the erection of a large cold storage plant for handling fruit and produce.

The Cloverport Boat & Machine Company, Cloverport, Ky., will replace the Cloverport Foundry & Machine Company, whose plant was recently destroyed by fire. The new firm plans to enlarge the scope of work done and will want a complete machine shop outfit and also woodworking machinery for its new plant.

The Central South

LOUISVILLE, KY., August 11, 1913.

One of the features of the present summer has been a shortage of ice in most of the cities of this section, the extremely hot weather, which has been almost continuous, having taxed the factories beyond their capacity. The immediate result of this has been a great increase in the number of projects for building ice factories, the almost unprecedented demand having stimulated enterprise in this direction to a marked extent. Manufacturers of ice machinery are therefore extremely busy, many orders having been booked, and while in most cases the factories are not intended to begin operation until next season, some of them will be able to get the end of this season's business in the sections further south. Other machinery lines are also in good demand, boilers and electrical apparatus moving well, while there is a good call for machine tools. Woodworking plants are busy and are making enlargements in many cases. The severe drought, which has badly damaged the corn crop, is the only unfavorable business factor with which members of the trade appear to be concerned at present.

The Henry Vogt Machine Company, Louisville, has been extremely busy both in its ice machine and boiler departments. The company is contemplating some improvements, the exact nature of which has not been divulged.

The J. Schwarzwald & Sons Company, a Louisville cooperage concern, which has been planning the construction of a new plant, has announced that its equipment will be motor-driven. The group system will be used. The company will need no additional boilers, but it will be in the market for a generator, motors and other electrical equipment, in addition to barrel-making machinery.

The Chawck-Smith Automobile Company, Louisville, has been incorporated with \$5,000 capital stock and will equip a repair shop at 713 South Seventh street. Harry Smith is manager.

Work on the addition to the plant of the J. V. Fischer Mfg. Company, metal button manufacturer, has been begun, and the company will be ready to install machinery within the next 30 to 60 days.

The Made-in-Louisville Association will have its first annual exposition the last week in August. The Abell Elevator Company, the James Clark, Jr., Electric Company, the Dow Wire & Iron Works, the Graf Stove & Range Company and the Fischer-Leaf Company will participate. One entire section of it will be devoted to machinery and foundry products.

The Indiana reformatory at Jeffersonville, opposite Louisville, is considering establishing a brick plant for the purpose of manufacturing material used by the institution.

The flooring factory and veneer mill of the Wood Mosaic Company, New Albany, Ind., a suburb of Louisville, was destroyed by fire last week with a loss of \$200,000, mostly covered by insurance. The company is now rebuilding at Highland Park, a Louisville suburb, a sawmill which was burned several months ago, and is considering locating the flooring and veneer plants there also.

The Franklin Electric & Ice Company, Franklin, Ky., is considering the enlargement of its ice factory, the present equipment not having sufficed to supply the demand during the current season.

The Independent Tobacco Warehouse Company, Lexington, Ky., has begun the construction of a \$60,000 tobacco warehouse at Limestone and South Upper streets. The plant will be equipped with elevators, presses and special machinery. R. L. Stivers is president.

Officials of the Illinois Central Railroad on a recent inspection trip gave definite assurances that repair shops would be built at Princeton, Ky., during the current year.

The National Steel Pulley Company, Maysville, Ky., which was recently incorporated with \$30,000 capital stock, is understood to be backed by the same interests which control the Ohio Valley Pulley Works, Maysville, Ky., manufacturer of wooden pulleys. It is stated that a plant for steel pulleys will be equipped at once. S. P. Browning is one of those chiefly interested.

The metal-working shop of E. A. Hurt, Corydon, Ky., was destroyed by fire recently, the loss being about \$200,000, partly covered by insurance.

The Green River Light & Water Company, Calhoun, Ky., will be in the market shortly for a direct connected generator. C. G. Gilmore is manager.

The Central City Light & Power Company, Central City, Ky., will probably need a 150 hp. boiler in the near future. I. V. Fortney may be addressed.

It is reported that the Glasgow Electric Light & Ice Company, Glasgow, Ky., will purchase a 150-kva turbo-generator in the next few months.

Plans for a new power plant are being considered by the Morganfield Light & Power Company, Morganfield, Ky., which will require two 200 hp. boilers, two three-phase 60-cycle, 2300-volt revolving-field belted alternators, one 200 hp. engine and a switchboard. F. W. Gilbert is president and general manager.

The Arlington Lumber Company, Arlington, Ky., will install an electric light plant for the service of its sawmill. It may also operate a street lighting system for the town.

The Hazard Steam Laundry Company, Hazard, Ky., has been incorporated with R. C. Baker president and Dan Stacy general manager, and is in the market for laundry machinery.

The Hazard-Dean Coal Company, Hazard, Ky., has announced that work on its new power plant will soon begin. It is also in the market for special mining machinery. W. R. Marsee is president and general manager.

J. E. Dayberry, Knoxville, Tenn., is to establish a steam laundry at Corbin, Ky. Equipment will be purchased shortly.

The Nashville Roller Mills, Nashville, Tenn., whose plant was recently destroyed by fire, has awarded a contract to Marr & Holman, engineers, for the construction of a new mill. It will have a capacity of 2500 barrels a day. A steam heating plant will be provided. Power and special equipment, including grain elevating machinery, will be required.

The grain elevator of March Bros., Nashville, Tenn., was recently damaged by fire with a loss of \$12,000. The damaged machinery will be replaced.

Swift & Co., of Chicago, Ill., have plans for a

\$40,000 poultry packing plant at Trenton, Tenn., to be equipped at once.

Pulaski Iron Company, Pulaski, Va., is developing an iron ore property near Cedartown, Ga. Log washers will be built. H. E. Lucas is in charge of operations.

Detroit

DETROIT, MICH., August 11, 1913.

The local market exhibits an activity that is pleasing to the merchants and a good volume of business is reported in miscellaneous tools for the general manufacturing trade. Inquiry is fair and covers a wide range of equipment. There has been a more active movement in second-hand machinery the past week, including several sales of from three to five tools. Local foundries are generally busy, but some curtailment of output is noticed and the amount of new business being booked is moderate. A considerable number of power plant installations have been reported and dealers are enjoying a brisk business in the smaller units. Building conditions are normal, the only large project announced being the letting of preliminary contracts for the hotel to be erected by H. M. Statler, of Buffalo, at a cost of about \$3,000,000.

The Continental Motor Mfg. Company has taken over the motor manufacturing department of the Lozier works at Detroit and is now installing a new power plant which will double the capacity of motor production in the new factory recently completed. The company has also finished the building of an automatic screw machine plant at its Muskegon branch.

The Cray Company, Detroit, has been incorporated with \$10,000 capital stock to manufacture automobile accessories. Lewis H. Kirby and Cecil R. Cray are the principal stockholders.

The Moyer-Shaw Mfg. Company, 173 Fort street West, Detroit, manufacturer of registering banks and metal stampings, has increased its capital stock from \$20,000 to \$33,000.

The Warner Detroit Motor Works, Detroit, has been incorporated with \$100,000 capital stock to manufacture automobiles. Hugh L. Warren and William A. Gleesen are the principal stockholders.

Gray & Davis, Amesbury, Mass., have purchased the automobile lamp manufacturing plant of the Sprague Waldo Mfg. Company, 19 Harper avenue, Detroit, Mich., and will start work immediately at the Detroit factory, the fourth operated by Gray & Davis. Machinery to the value of \$75,000 will be installed. F. E. Holmes will be the Detroit representative and manager of the plant.

The Pearson Carbon Remover Company, Detroit, has been incorporated with \$25,000 capital stock, to manufacture lubricants. The principal stockholders are W. H. Pearson, Jr., and C. C. Goodrich.

The Farrand Organ Company, Twelfth street and the Grand Trunk Railway, Detroit, on account of insufficient working capital has filed a petition in the circuit court in chancery, asking the appointment of the Detroit Trust Company as receiver, and dissolution of the company. An order has been entered and the Trust Company has taken possession of the affairs of the company.

The McClintock Engine Company, Detroit, has been incorporated under Delaware laws, by Francis C. Osborn, G. Edgar Allen and Charles D. McClintock, with a capital stock of \$200,000. The company will manufacture and deal in all kinds of internal combustion engines.

The Detroit Trust Company has been appointed receiver of the Michigan Buggy Company, Kalamazoo, Mich., manufacturer of buggies and automobiles. The factory will be operated by the receiver.

The plant of the Michigan & Lake Superior Power Company, Sault Ste. Marie, Mich., will be sold at public auction August 26. It is hinted that it will be bid in by Chicago capitalists who have filed articles of incorporation for the Michigan Northern Power Company, with a capital stock of \$3,000,000.

The Port Huron plant of the Morton Salt Company will expend a large sum of money in improvements this summer. Joy Morton, Chicago, is president of the company.

The Chevrolet Motor Company, which is moving its plant from Detroit to Flint, Mich., expects to begin operations in its Flint plant about September 1. The company will occupy the buildings that are being vacated by the Imperial Wheel Company, the latter having transferred its machinery and other equipment to the Webster plant. Extensive alterations have been made to the Webster plant, including a power house and dry kilns.

The Differential Clock Company, capitalized at \$200,000, with headquarters in Chicago, has opened offices and a factory at Grand Rapids, Mich. The company will also manufacture various mechanical devices besides clocks. Charles Ashton and P. D. Leavenworth, Grand Rapids, are interested in the enterprise.

John N. Willys, who purchased the assets of the Castle Lamp Company, Battle Creek, Mich., manufacturer of automobile lamps, is removing the plant to Toledo, Ohio.

The Hayes Wheel Company, Jackson, Mich., will manufacture the shock absorber hub for automobiles, introduced in America by John Muir of London.

The Independent Stove Company, Owosso, Mich., manufacturer of stoves, is considering the erection of an addition to its plant.

The taxpayers of Midland, Mich., have voted \$25,000 bonds for waterworks improvements.

The True Hay & Stock Rack Company, Eaton Rapids, Mich., manufacturer of wagon racks, has shut down its factory for a month to make improvements.

The Bolted Basket Company, Boyne City, Mich., will resume operations after a shutdown on account of fire destroying its plant.

The Eagle Tanning Works, Whitehall, Mich., has completed the installation of new machinery and has started operation.

The Escanaba Lumber Company, whose plant at Masonville, Mich., burned last year, will build a sawmill at Pike Lake, Mich.

The taxpayers of East Grand Rapids, Mich., have voted \$25,000 bonds for a waterworks system.

Ground has been broken for the new hardwood flooring mill to be erected by William Horner, Reed City, Mich.

Milwaukee

MILWAUKEE, WIS., August 11, 1913.

The volume of machinery business in this district compares more than favorably with that of a year ago. A better feeling appears as the result of some fairly good bookings and the receipt of attractive inquiries. The milling machine builders are getting some excellent business from the automobile manufacturers and parts makers, much of this being special machines on repeat orders for additions and replacements. Tool business in general has somewhat improved. The smallness of heavy machinery and power equipment buying is not considered unusual. Municipalities are about the only new buyers at this time, and they are not doing a great deal. The labor situation is satisfactory. The labor market report of the Industrial Commission for July states that factory work was slack during the month, while outside labor was in great demand. This condition was general throughout the State, although in small towns inside work was fairly plentiful. Machinery men look for continued improvement, particularly after the close of the present month.

The city of Milwaukee has awarded the contract for the construction of substructure and superstructure of the new Buffalo street bascule bridge to Arthur H. Vogel, vice-president and treasurer of the C. H. Starke Dredge & Dock Company, Milwaukee, at \$164,847. The superstructure contract has been sub-let to the Milwaukee Bridge Company, Milwaukee. This was the second call for bids, all tenders under the original call having been rejected because they exceeded the appropriation of \$175,000.

The Badger Safety Razor Company, Milwaukee, has been incorporated with \$25,000 capital stock to manufacture safety razors and other cutlery. William C. Dusold, C. W. Petoskey and Fred R. Dengel are the incorporators.

The Sternberg Mfg. Company, Milwaukee, motor truck builders, has decided to increase its production from 125 to 250 trucks per annum and has broken ground for a large addition to its works at a cost of \$40,000. The present plant was erected three years ago.

The city of West Allis, Wis., is in the market for a 2000-gal. centrifugal pump for immediate delivery and has provided for the purchase of a 3000-gal. pump either late in the fall or early next spring.

Carl Bruderly, Fond du Lac, Wis., is interesting Oshkosh capital in the manufacture of electrical appliances and specialties of his own invention. He intends to locate the proposed factory at Oshkosh.

The Vilter Mfg. Company, Milwaukee, was awarded the contract for all refrigerating and power machinery and piping and tanks for the improvement of the cold storage properties of the Milwaukee-Western Cold Storage Company, which has just taken over the property of the United Cold Storage Company, Milwaukee.

Heyl & Patterson, Pittsburgh, who have operated in Wisconsin for several years as ore and coal dock construction contractors, have incorporated under the name of Heyl & Patterson, to manufacture coal-handling machinery. Wm. A. Heyl, E. W. Heyl and M. H. Hager, all of Pittsburgh, appear as incorporators. Wisconsin headquarters are at Superior and general offices at 51 Water street, Pittsburgh.

The Beloit Nickel Plating & Mfg. Company, Beloit, Wis., has been organized by G. A. Raguse and P. F. Kuklenski to conduct a nickel-plating, polishing, tool-grinding and manufacturing and repair business. A shop has been equipped, located at 1022 Central avenue. A specialty will be made of threshing and other heavy farm machinery repairs and rebuilding.

T. A. Gray and H. R. Gray have organized the Wisconsin Burner Company and established a shop at 534 Eighth street, Beloit, for the manufacture of burners for lamps, stoves and furnaces. Nearly all immediate requirements have been filled.

The Thos. B. Jeffery Company, Kenosha, Wis., automobile manufacturer, is installing a large amount of new machinery and power equipment, including a 2200-hp. unit consisting of a cross compound engine direct connected to an alternating current generator. The improvement scheme will be carried on through the next eight or ten months and purchases will be made from time to time.

The Oshkosh Pneumatic Hub Company, Oshkosh, Wis., incorporated with \$20,000 capital, intends to start within a few weeks on the equipping of a plant for the manufacture of devices designed by Joseph Laus, Jr. Factory leases are now in negotiation, but it is the intention later to build a plant.

M. A. Lemke will erect a machine shop and garage at Kaukauna, Wis., and will need some light power tools and a small assortment of miscellaneous tools and machinery.

The Aluminum Goods Mfg. Company, of Manitowoc and Two Rivers, Wis., awarded contracts last week for the construction of two new buildings at Two Rivers, consisting of a rolling mill, 44 x 370 ft., and a power plant. The Majestic Construction Company, Milwaukee, was the successful bidder. This company is now completing a large addition to the Manitowoc plant. The present power house at Two Rivers will be turned into a blacksmith shop and it is the intention to rebuild all frame structures with brick next spring. C. H. Tegen, Manitowoc, is architect.

The Osceola Mill & Elevator Company, Osceola, Wis., has increased its capital stock from \$50,000 to \$125,000 and will build additions.

St. Louis

ST. LOUIS, MO., August 11, 1913.

The machine tool market the past week has shown a slackening of business that is only in part accounted for by the season. Crop reports from a portion of the St. Louis territory, especially those sections raising corn, have been very unfavorable, and in Kansas especially there has been a sudden conversion to pessimism. From the general standpoint, however, it is the belief that there will be an improvement with the passing of the midseason period. Inquiries for tools are very light and practically none remain unfilled.

The St. Louis Wire & Iron Company, St. Louis, has bought a new factory site on Chouteau avenue and will build a larger plant on the newly acquired property. Theodore R. Tiesler is president and Ferdinand P. Laclercq secretary.

The property of the Carondelet Milling Company, St. Louis, has been bought by Frank W. Feuerbacher and others who have plans for the remodeling of the plant, the addition of new machinery and its operation in more extended form.

The St. Louis Screw Company, St. Louis, has bought a further addition to its new site, having enlarged its plans for the construction and equipment of its new plant, recently prepared for by an increase of \$400,000 in its capital stock.

The board of public improvements of the city of St. Louis has plans for the installation of a refrigerating plant for the water supply of both the city hall and the municipal courts and jail buildings adjoining.

E. E. Wall, water commissioner, of St. Louis, has completed plans and will shortly begin the actual work of improvement of the pumping station and the storage system of the St. Louis city waterworks. The plans include two new pumps.

The Johnson Butterine Company, St. Louis, has been incorporated with a capital stock of \$50,000 by J. R.

and W. R. Morris and J. Forbes Johnson, and will equip a plant for the manufacture of butterine, etc.

The Perfect Gas Regulator Company, St. Louis, has been incorporated with a capital stock of \$12,000 by J. B. Thieme, Harry Kunze, A. Fletcher and John Becker, Jr., to manufacture gas regulating machines.

The Briquette Coal Mfg. Company, of St. Louis, which recently increased its capital to \$160,000, is in the market for pulverizing machinery, conveying machinery, compressing equipment, power equipment, etc.

The Harry Benjamin Equipment Company, Central National Bank Building, St. Louis, recently incorporated, is in the market for a shear, wheel press, rail straightener and other equipment for handling and preparing second-hand material for the market.

The South Side Machine Company, St. Louis, has been incorporated with a capital stock of \$3000 by Clem Atteln, Henry Lindell and Vincent McShane.

A hotel to cost about \$250,000 is to be built in St. Louis under the direction of John H. Bogue, George W. Brown and others, and will include its own electrical equipment as well as heating and power plant, etc.

The University of Missouri, Columbia, Mo., will build an electric plant from plans prepared by the electrical engineering seniors. It will be of 1000-hp. capacity, with distributing equipment, as well as generating machinery, etc.

The Automatic Car Brake Company, St. Joseph, Mo., has been incorporated with a capital stock of \$100,000 by Charles E. Rochambeau and Thomas L. Ritchey, of St. Joseph, and James L. Satterfield, of Delaware, and will equip a plant for the manufacture of patented automatic brakes.

The W. O. Cragg Mining Company, Joplin, Mo., will improve its plant with a 300-ton concentrating equipment, including four gas engines of a total of 365 hp. The whole plant will probably be electrified.

The establishment of a woven wire plant at Cathage, Mo., under the auspices of the Business Men's League of that city, is planned by W. M. Fitzgerald, of Oklahoma.

The J. W. Brush Company, Kansas City, Mo., will build a three-story building and equip it with machinery for the manufacture of mop wringers.

The Grieb-Ziler Garage Company, Kansas City, Mo., will rebuild its building and re-equip it with repair machinery.

The plant of the American Scale Company, Independence, Mo., was destroyed by fire August 7, with a loss of more than \$50,000.

The city of Charleston, Mo., has completed the preliminary plans for a vote of \$81,000 of bonds for a waterworks and sewer plant.

The Van Cleve Saw Mill Company, St. Louis, Mo., has increased its capital stock from \$10,000 to \$25,000 for the purpose of increasing its plant equipment.

R. A. Long, Kansas City, Mo., in making improvements at Hickman Mills, Mo., will install a pumping plant, a 50,000-gal. filter plant, and a 100,000-gal. reservoir.

The St. Elmo Quarry Company, Springfield, Mo., is in the market for stone saws, planers, hoisting equipment, etc.

The Prier Brass Mfg. Company, Kansas City, Mo., has increased its capital stock from \$60,000 to \$100,000 for the purpose of extending its operations, adding equipment, etc.

The Parrett Tractor Company, Ottawa, Ill., has been incorporated with a capital stock of \$50,000 by Dent and Henry T. Parrett and Henry Poilard to equip a plant for the manufacture of traction machinery.

The L. Krumpen Machine Company, Stuttgart, Ark., will erect and equip a machine shop at once.

The Farmers' & Merchants' Gin Company, Francis, Okla., has been incorporated with a capital stock of \$16,000, to equip a cotton ginnery.

The Poteau Cotton Oil Mill Company, Poteau, Okla., has been incorporated with a capital stock of \$14,000 by Edward L. Moore, Charles C. Bush and others to equip a cotton oil mill.

The Sand Springs Light & Power Company, Sand Springs, Okla., announces plans to double the capacity of the present plant at once.

The Hugo Steam Laundry Company, Hugo, Okla., recently incorporated by Daisy E. Burton and others, has plans for the removal of the present plant to another location and the installation of considerable new equipment.

The Leedy Broom Company, Leedy, Okla., has been incorporated with a capital stock of \$10,000 by L. H. Oliver, F. W. Crow and E. C. Ruff, and will equip a broom factory.

Anderson Bros. & Arenz, Enid, Okla., will equip

a building to be occupied by the Model Carriage Works as a vehicle manufacturing plant.

The Leflore Compress & Storage Company, Greenwood, Miss., has been incorporated with a capital stock of \$75,000 by Joseph W. Newburger, P. A. Malone and others and will equip a large cotton compress plant.

The Clyde Machine Works, Gulfport, Miss., is reported in the market for hoisting and other equipment.

The W. G. Ragley Lumber Company, recently reported incorporated with \$600,000 capital, by R. H. Fulerton, of St. Louis, Mo.; W. G. Ragley, of Ragley, Tex., and others, is planning a mill at De Ridder, La., of 100,000 ft. daily capacity.

Bids will be received by D. Mahaffy, town clerk, Georgetown, Miss., until September 1 for a waterworks plant.

The Acadian Furniture Company will establish a factory at New Orleans, La. The company plans to spend \$100,000 on the buildings and equipment. C. B. Fischer, J. R. Westerfield and others are interested.

The Meridian Lumber Company, recently incorporated with \$250,000 capital, by A. B. Spencer, C. T. Crowell, R. D. Crowell, of Long Leaf, La., will equip a mill of 125,000 ft. daily capacity at Pierre, La.; also a planing mill of seven machines.

The Poitevant & Favre Lumber Company, New Orleans and Mandeville, La., will equip at Mandeville a double circular saw mill of 100,000 ft. daily capacity.

A municipal ice manufacturing plant is planned at Shreveport, La., under the direction of the mayor.

The Indian Creek Lumber Company, Forest Hill, La., has been incorporated with a capital stock of \$25,000 by W. F. Goodnight, Lyman H. Mizell and others, and will build a sawmill at once.

The Brown Stave Company, of Monroe, La., will install stave factory equipment at a cost of \$25,000 at Shreveport, La.

The Algiers Distilling Company, New Orleans, La., has been incorporated with \$750,000 capital stock by Albert J. Olivier, James J. Killilea and Frank P. Killilea and will equip a large distillery at once.

The city of New Iberia, La., is having plans prepared for a sewage disposal plant to cost about \$75,000. X. A. Kramer, of Magnolia, Miss., is the engineer in charge.

The Roseland Veneer & Package Company, Roseland, La., will rebuild and re-equip at once its recently burned plant.

Texas

AUSTIN, TEXAS, August 6, 1913.

Unusual activity this fall in the way of improving public utility plants in many Texas cities and towns is anticipated. The cotton crop prospects have been materially improved the last few days by good rains that covered nearly the entire cotton-producing territory of the State.

Sears, Roebuck & Co. of Texas will erect an additional building at Dallas. The contract price for the building proper is \$474,000. Heating, lighting and mechanical equipment will cost \$300,000. The building will have a lighting and power plant. Extensive elevator and carrier service, electrically operated, will be installed so as to facilitate the handling of commodities from floor to floor, along floors and between cars and the building. The company already has buildings in Dallas costing nearly \$800,000. Lang & Wittchell are the architects for the new building. The Hughes-O'Rourke Construction Company is the contractor.

McCormack & Chambers are creating a cotton gin at Pearland.

R. L. Dennison and associates have been investigating the clay deposits and other conditions at Port Arthur with the view of constructing a large brick manufacturing plant near that place.

Capt. Fred Swails, superintendent of construction of the Southern Dredging Company, Galveston, will soon begin the construction at Orange of a large dry dock.

Silas M. Depew, Sr., will install a suction pump and other machinery for excavating sand and shell near Orange.

The Provident Land Company is erecting a cotton gin at Provident City.

The taxpayers of Quanah have voted \$20,000 bonds for enlarging and improving the municipal waterworks system. Water will be pumped from Groesbeck, three miles from Quanah.

Arrangements are being made for the construction of a system of waterworks at Stockdale.

The Gonzales Cotton Mill Company will enlarge its cotton mill at Gonzales.

The Lone Star Gas Company, Ft. Worth, is laying

an additional 30 miles of 16-in. natural gas pipe line out of the Petrolia field. It will also make other additions and improvements to its gas-distributing system.

The Young Men's Business League of Palestine is promoting the organization of a company to pipe natural gas from Mexia to Palestine and to construct a distributing system at the latter place.

The Pioneer Natural Gas Company is preparing to construct a pipe line from the Moran field to the towns of Cisco, Baird, Abilene and other places on the line of the Texas & Pacific Railroad. The company will lay distributing systems in each of the towns reached by its proposed line.

The Texas Gin Company has been organized at Waco for the purpose of erecting a cotton gin. M. D. Anderson is interested.

The Richland Gin Company will erect a cotton gin at Richland. A. A. Allison is interested.

The Progressive Gin Company has been organized at Poteet for the purpose of erecting a cotton gin. J. H. Mangum is interested.

The Tampico Light & Power Company, composed of British capitalists headed by Lord Cowdrey of the firm of S. Pearson & Sons, Ltd., has begun the construction of an extensive system of electric street railroad at Tampico, Mexico. It will also build an interurban electric line from Tampico to the suburban resort of La Barra, six miles. The same interests own the electric street railroad system of Vera Cruz and are operating the National Tehuantepec Railroad under a 51-year lease.

The Nacozari Consolidated Copper Company has made plans for a new 100-ton ore concentrating plant that it will erect at its mines near Nacozari, state of Sonora, Mexico.

The City Council of Belton has awarded the contract to M. H. Lenard of Austin for the engineering work connected with the proposed improvements that are to be made to the local waterworks plant. Bonds in the sum of \$20,000 were recently issued for this work. The distributing system will be extended and the pumping station enlarged.

The Atchison, Topeka & Santa Fé Railway is constructing a system of waterworks for its use at Hereford. It is reported that it will move its division shops to that place.

The taxpayers of Runge will vote August 27 on \$20,000 bonds for the construction of an electric light and power plant and a waterworks system.

Joe F. Carroll and associates, who recently purchased the cotton seed oil mill of the Beaumont Cotton Seed Oil & Refining Company of Beaumont, will enlarge and make improvements to the plant.

Birmingham

BIRMINGHAM, ALA., August 11, 1913.

While midsummer weather controls the machinery market to an extent, sales of all sorts of goods are normal and above and inquiries for fall equipment are such as to presage good conditions during the fall and winter. Crop prospects are good. Oil mills will work to capacity. There is a special demand for various types of small engines, for pumps and for general coal mine equipment.

The Lindsey Lumber Company, Pollard, Ala., the plant of which was recently burned, has decided to rebuild.

The Jasper Oil & Fertilizer Company, Jasper, Ala., has been incorporated with a capital stock of \$25,000. It will operate a cotton seed oil mill and fertilizer factory. J. M. Phillips, of Jasper, is president.

The Barwick Implements Company, Atlanta, Ga., has been incorporated with a capital stock of \$500,000 and will manufacture agricultural implements. J. P. Armstrong, Augusta, Ga., and J. W. Barwick and Garnett McMillan, Atlanta, are among the incorporators.

A company has been organized at Guntersville, Ala., with \$20,000 capital stock for the manufacture of cotton seed oil. J. H. Carter is president.

The Pinehurst Fertilizer Company, Pinehurst, Ga., incorporated by G. W. Fullington, M. C. Peavy and F. A. Peavy with \$10,000 capital stock, will establish an oil mill.

The Garratt Lumber Company, Fitzgerald, Ga., has been incorporated with a capital stock of \$50,000, to operate sawmills. T. J. and Don Dickey, of Fitzgerald, and W. F. Boyd, of Douglas, Ga., are interested.

The Renfro Williams Company, Jacksonville, Fla., has been incorporated with a capital stock of \$100,000, to manufacture lumber, by H. H. Renfro, R. R. Williams and associates.

The German-American Lumber Company, Millville,

Fla., has purchased 100,000 acres of timber land and will, it is reported, enlarge operations already conducted at Millville and other places.

The St. Andrews Bay Company has been organized for the purpose of establishing a large sawmill and wood pulp plant at Callaway, Fla. The mill will have a daily capacity of 250,000 ft.

The Pacific Coast

SAN FRANCISCO, CAL., August 8, 1913.

Sales of single tools from stock have been quite numerous of late, and the number of tools in local stores has become considerably reduced. Merchants are sending in orders to replace practically everything that is sold, and in general are disposed to keep their assortments fully up to the usual standard. Large orders are scarce, but some important business is expected shortly from the Mare Island Navy Yard, the navy repair ship and other Government work. A supplementary list for the repair ship, consisting mostly of compressing and drilling machinery, is out for preliminary estimates. Several other propositions which were held up for a time are taking more definite shape, and a good business is expected this month. Woodworking machinery and most lines of miscellaneous equipment are still rather quiet, inquiries being numerous, but orders slow in coming through. Somewhat better progress is being made on water and power development projects, but money is too scarce to permit much increase in the scale of operations. Frequent inquiries are still coming out for road machinery, but rock crushing and handling outfits receive less interest than was expected. The letting of several large contracts for dimension stone may bring out some good orders from the granite quarries. Owners of many manufacturing plants on the Pacific coast plan to increase their capacity materially within the next year or two, expecting a heavy increase in the general requirements of the country, but for the present are awaiting the readjustment of tariff and financial conditions.

Owing to the growth of its steel casting business, the C. L. Best Gas Traction Company, San Leandro, Cal., has segregated this department, which has been incorporated as the Best Steel Casting Company. C. L. Best is president. Others prominently connected with the company are Messrs. Botchford and Tuohy, formerly with the Columbia Steel Company, C. Q. Nelson, and Charles P. Bannon. Another building has just been added to the plant.

The Meese & Gottfried Company, handling transmission machinery, etc., has just occupied its new building at 658-664 Mission street, nearer the commercial center than its former quarters. The ground floor will be used for general offices and the second floor for the engineering department, the remainder of the building being reserved for a large stock of transmission equipment.

The Los Angeles & San Diego Beach Railway is laying out a site for a power house, machine shop, etc.

The Baldwin Power Company is preparing to construct a 2500-hp. hydroelectric plant at Forest Home, near Redlands, Cal.

The E. K. Wood Lumber Company is preparing to increase its plant on Los Angeles harbor, putting in two new boilers, a 600-hp. engine, etc.

The Pacific Electric Railway, Los Angeles, has announced plans for the installation of safety devices, the expenditure for this purpose being estimated at about \$500,000.

It is reported that a large addition will soon be made to the new Prest-O-Lite plant in South San Francisco.

C. F. Braun & Co., San Francisco, have taken a contract for a 450-hp. steam turbine pumping engine for the city of Sacramento, Cal.

It is announced that Butte County, Cal., will purchase three steam rollers during the next year. The city of Los Angeles took figures on a steam roller this week, and the city of San Francisco is taking bids on a five-ton Kelly-Springfield steam roller. Fresno, Cal., is taking figures on a grader.

Considerable interest has lately been taken in garbage disposal equipment. The city of Los Angeles has let a contract to C. D. Crouch, Chicago, who will erect a large disposal plant. City officials of Santa Cruz and San José, Cal., have been investigating disposal systems, with the intention of installing plants.

Bids will be called for the construction of a foundry and machine shop, boiler shop, forge shop, wood working and pattern shops and a pattern storage building, for the Sumner Iron Works, Everett, Wash., whose plant was recently destroyed by fire.

Western Canada

WINNIPEG, MAN., August 8, 1913.

A considerable volume of business in machinery parts is coming in, but not many large contracts are being made. Several of the leading cities and towns of Manitoba, Saskatchewan and Alberta report negotiations under way toward the establishment of one industry or another, and there is promise of considerable construction work throughout the Central West in the late summer and fall. The money stringency, however, is delaying the start of new enterprises and the extension of those already established.

The contract for the construction of an incinerator at Ft. William, Ont., has been let to M. H. Braden of that city. It will cost about \$30,000.

The Lethbridge Brick & Terra Cotta Company, Lethbridge, Alberta, is planning an extension to the plant for making pressed brick.

The mill of the Standard Lumber Company, Cranbrook, B. C., was destroyed by fire last week and considerable new machinery will be required in rebuilding. The loss was about \$35,000, partly covered by insurance.

The Edmonton Plate Glass & Mirror Company will erect a factory at Edmonton, Alberta.

The Kaministiquia Power Company, Ft. William, which already has 35,000 hp. developed, contemplates an additional large outlay in enlarging the plant. It is said that the proposed additions will consist of either two units of 5000 hp. each or a single unit of between 10,000 and 15,000 hp.

The X Tenn Mfg. Company, Regina, Sask., has been incorporated with a capital stock of \$150,000 and will manufacture grain-drying bins.

Kasimir Kocot has purchased the Regina Brewery, Regina, Sask., and intends to spend \$135,000 on improvements and additions.

The City Council of Calgary, Alberta, is planning the erection of a power substation. J. M. Miller is clerk and George Craig is engineer.

The Campbell River Lumber Company is erecting a large sawmill at White Rock, B. C.

Joseph Parker, formerly president and general manager of the Parker-Bell Lumber Company, Seattle, is erecting a large shingle mill at Eburne, B. C.

Robert Weder, Port Saskatchewan, will erect a flour mill to cost \$18,000, at Innisfree, Alberta.

The Staince Company will erect a four-story factory and warehouse at Edmonton, Alberta, for the manufacture of iron beds, spring mattresses, etc.

Eastern Canada

TORONTO, ONT., August 9, 1913.

Molders engaged in a number of city foundries have gone out on strike after receiving a definite denial of their demand that a 10-hr. day be reduced to 9. The strike affects seven foundry companies, but the employers declare that the strikers' places will be filled immediately.

The ratepayers of Welland, Ont., have passed a by-law granting a stated rate of taxation to the Electric Steel & Metals Company, Ltd. This company has secured a site, signed a contract for several thousand electric horsepower, and will erect a plant to melt iron and steel by electricity, making only the higher grades of steel. It is expected that construction will be started soon and rushed to completion.

Extensive yards with roundhouse and machine shops are to be built at Port Colborne, Ont., by the Grand Trunk Railway Company. N. Fergusson is superintendent of the construction department, Montreal.

The Kelsey Wheel Company, Detroit, Mich., will erect a Canadian branch factory at Windsor, Ont., 60 x 100 ft., and 50 x 300 ft., one and two stories, reinforced concrete and brick.

The LaSalle Construction Company, Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by Francis G. Bush and others to manufacture gas making plants and apparatus.

Girard & Godin, Ltd., Three Rivers, Que., has been incorporated with a capital stock of \$10,000 by Henry Elliott, Charles J. E. Charbonneau and others to manufacture automobile bodies, coaches and carriages.

The Canadian Gurney Elevator Company, Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by Gordon W. MacDougall, Lawrence MacFarlane, Charles A. Pope and others to manufacture and install elevators and elevator supplies.

James S. Elliott & Son, Ltd., Prescott, Ont., has been incorporated with a capital stock of \$10,000 by H. J. Elliott and others to manufacture caskets, coaches, carriages and automobile bodies.

The property owners of Aurora, Ont., have passed a by-law authorizing \$16,000 to be expended for the purchase of electrical machinery and apparatus. Another by-law authorizing \$5000 to be spent for electric pumps was carried.

The London Foundry, London, Ont., in which D. J. Cowan and others are interested, has been sold to a St. Catharines firm which will manufacture automobile parts. It is expected that the plant will be enlarged.

The Grand Trunk Railway announces that it will build at once one of the largest elevators on the lakes at Point Edward, Ont., to replace the structure recently destroyed by fire. The new elevator will be of steel and concrete.

The Amherst Pianos, Ltd., Amherst, N. S., is erecting a three-story factory building, 60 x 220 ft.

The New York Architectural Terra Cotta Company will erect a Canadian plant at Iberville, a small town across the river from St. Johns, Que.

John W. Peck & Company, Ltd., Montreal, are making additions to their plant to cost \$200,000, which will double the output.

The J. L. Morency Company, Quebec, Que., is building an addition to its factory for the manufacture of folding paper boxes, to cost \$25,000.

The Mount Royal Brick Company, Ltd., is building what it claims to be one of the largest brick plants in the world at Mount Royal, Que.

The Sorel Iron Works, Ltd., Sorel, Que., is moving its plant to Maisonneuve, Que., and will add to its present business of manufacturing boilers, engines, etc., a department to manufacture automobiles. The new name of the company will be Oxford Motor Cars & Foundries, Ltd.

The Canadian Flax Mills, Ltd., Toronto, will build a flax mill at St. Catharines, Ont., to cost \$150,000.

The Union Switch & Signal Company will erect a factory at Montreal.

Government Purchases

WASHINGTON, D. C., August 7, 1913.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids for navy yard requirements as follows:

Until September 2, schedule 5723, for the Puget Sound Navy Yard, corner drills, fitted with No. 3 and 4 Morse Taper socket.

Until September 2, schedule 5729, for Philadelphia, a pneumatic jarring machine.

Until September 2, schedule 5730, for Brooklyn, turbine-rotor drums.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, on August 5, for supplies for the navy yards, as follows:

Schedule 5623—Steam Engineering.

Class 5, Puget Sound—Six engine lathes—Fairbanks Company, \$2330 and \$2393; Hallidie Machinery Company, \$2500; Manning, Maxwell & Moore, \$2888, \$3009, \$2938, \$2937 and \$2970; Niles-Bement-Pond Company, \$2348; Perrin Machinery Company, \$2279.50; Joseph T. Ryerson & Co., \$2060.

Class 5, Alternate—Six engine lathes, f.o.b. works—Fairbanks Company, \$2180 and \$2243; Hallidie Machinery Company, \$2161; I. H. Johnson, Jr., Company, \$2240.66; Manning, Maxwell & Moore, \$2777, \$2706, \$2656, \$2705 and \$2750; Niles-Bement-Pond Company, \$2187.

Schedule 5644—Construction and Repair.

Class 55, Boston—One 3-motor electric traveling crane, inspected at place of manufacture—Cleveland Crane & Engineering Company, \$3800 and \$3900; Exeter Machine Works, \$3600; Morgan Engineering Company, \$4685; Manning, Maxwell & Moore, \$3888; Niles-Bement-Pond Company, \$4260; Pawling & Harnischfeger, \$3900; Whiting Foundry Equipment Company, \$4450.

Class 55, Alternate—One 3-motor electric traveling crane, inspected at point of delivery—Exeter Machine Works, \$3600; Morgan Engineering Company, \$4685; Manning, Maxwell & Moore, \$4038; Niles-Bement-Pond Company, \$4260.

Schedule 5645—Steam Engineering.

Class 61, Brooklyn—Two hand-power geared traveling cranes—Brown Hoisting Machinery Company, \$2345; Cleveland Crane & Engineering Company, \$1279; Curtis Pneumatic Machinery Company, \$659, part; Exeter Machine Works, \$2304; R. W. Geldart, \$1650; Manning, Maxwell & Moore, \$1760; Northern Engineering Works, \$2120; Niles-Bement-Pond Company, \$2350; Pawling & Harnischfeger, \$2250; Whiting Foundry Equipment Company, \$1750.

Schedule 5646—Steam Engineering.

Class 62, Philadelphia—One motor-driven flange facing machine, Newton Machine Tool Works, \$1100 and \$1135.

Schedule 5647—Steam Engineering.

Class 63, Norfolk—One 6-in. combination shockless jarring and roll-over molding machine—Tabor Mfg. Company, \$2500.

The following bids were opened July 11 by W. J. Barden, major of engineers, U. S. Army, Washington, D. C., for furnishing three motor-driven, two-stage air compressors:

Ingersoll-Rand Company, \$6930; Bury Compressor Company, \$7265; Chicago Pneumatic Tube Company, \$5858; National Brake & Electric Company, \$10,095; Blake & Knowles Steam Pump Works, \$7350; Walsell Machinery Company, \$7166; Hall Steam Pump Company, \$6620.

Trade Publications

Receiver Steam Separators.—Harrison Safety Boiler Works, North Philadelphia Station, Philadelphia, Pa. Section B of catalogue No. 500. Describes high pressure steam separators equipped with large capacity wells or receivers for not only storing water, but also steam between the intervals of the opening of the engine admission valve. One of the advantages claimed for the use of a separator of about three times the capacity of the high pressure cylinder is that shocks and pulsation in the steam line can be avoided and a higher velocity of flow is permitted. A chart showing the most economical diameter of piping to be used under given conditions is included.

Motor-Driven Boring and Turning Mills.—H. Bickford & Co., Lakeport, N. H. Circular. Covers a line of motor-driven boring and turning mills, for which the special features of simplicity, rigidity and efficiency are claimed. These mills are built in five sizes with swings ranging from 50 to 96 in. A view of the 7-ft. mill is given and a condensed dimension table of the different sizes is included.

Pig Iron.—Crockier Bros., 30 East Forty-second street, New York City. Folder. Points out the advantages of manganese in foundry mixtures and shows how the percentage of manganese in mixtures can be raised and improved results secured by the use of varying quantities of Tuscaloosa pig iron, which runs from 0.6 to 0.8 per cent. of manganese and can be supplied in special cases with a 1 per cent. or higher content of this element.

Geared Head Lathe.—Bridgeford Machine Tool Works, Rochester, N. Y. Circular. Treats of a 48-in. lathe, which is designed for the severest requirements and is built in any length of bed desired. On motor-driven machines the lathes are arranged for direct geared drive through a rawhide intermediate gear. An illustrated description of this lathe appeared in *The Iron Age*, April 24, 1913.

New Tools and Appliances

This is essentially a news department for which information is invited

Engine Lathe Gear Guard.—A new form of gear guard is being applied by the Walcott & Wood Machine Tool Company, Jackson, Mich., to its entire line of engine lathes. The lower part of the guard is made integral with the headstock casting, and is machined on the top face to fit the top or removable portion of the guard. This guard completely incloses the back gears, thus protecting the operator against accident, and the change and reverse gears are also protected, the two latter guards being easily and quickly removed when necessary.

Universal Tool and Cutter Grinding Machines.—The Woods Engineering Company, Alliance, Ohio, has recently brought out a grinding machine which is universal in all its movements and is designed to meet the requirements of toolroom grinding. The base and column are internally braced, and a projecting boss carries the bronze elevating nut and also incases the lower part of the elevating screw. The column is entirely encircled by the knee, which slides on a V-key adjustable for wear and is raised or lowered in a straight line to the extreme of its travel. The saddle slides in the knee with a 45-deg. bearing surface and has an adjustable gib. Its top forms a convenient place for tools and work, and a wrench rack cast solid just below the table top holds all of the wrenches required in a convenient position for immediate use. Adjustable stops furnish a means for positively grinding to a shoulder. The top table swivels on a central stud, and has a bearing for its full length without overhang. A screw adjustment is provided for taper work and there are two T-slots in the top table to increase its range.

A Universal Gasoline Blow Torch.—The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has brought out a gasoline blow torch which is adapted for all conditions of service. The burner is made especially heavy to enable it to retain its heat and keep the torch burning when the weather is either cold or windy. The drip cup is made deep, so that the torch can be started under adverse weather conditions, these features, however, not interfering in any way with the use of the torch for indoor work. A self-cleaning burner valve, in which the needle at the end of the valve stem cleans the hole automatically as the valve handle is turned is another feature. With this arrangement it is not necessary to pick at the opening to clean it, and consequently the valve seat is not injured. A separate plug which may

be removed when necessary is used for valve seat and is employed for the valve handle. To insure the valve keeping its proper shape under rough handling, an extra corrugated brass disk which covers the entire inner surface of the tank pot is used.

Valve Reseating Tool.—For use on the Jenkins type of valve, the Abbott Hardware Company, 638 Columbus avenue, New York City, has brought out a reseating tool consisting of four essential parts. These are the spindle proper, the spindle upon which it is mounted, a sleeve surrounding the spindle and a double cone of threaded disk which screw into the bonnet opening of the different sizes of valves for which the tool is adapted. In reseating a valve a cutter of the proper size is first mounted on the spindle, after which the threaded disk is screwed into the valve bonnet by a knurled wheel provided for this purpose. To feed the cutter down to the work an upper knurled wheel which rotates the threaded sleeve surrounding the spindle is operated, and the cutter itself is turned by rotating the handle at the end of the spindle. Valves from $\frac{1}{4}$ up to 2 in. can be reseated by the use of this tool.

Gauge for Measuring Cutter Clearance.—For aiding the operator in grinding the correct clearance angle on milling cutters the Brown & Sharpe Mfg. Company, Providence, R. I., has recently placed on the market a cutter clearance gauge, consisting of a steel bar, $6\frac{1}{2}$ in. long, and having a stud for holding the cutters attached at one end. A set of five hardened steel bushings is provided for cutters having holes ranging from 1 to 2 in. in diameter, these bushings being held in place on the stud by a spring stop. The gauge is mounted on a slide which is moved along the bar by a slight pressure and is attached to the side of the slide by a pin, which permits it to be revolved, one end being used for cutters over 3 in. in diameter and the other for smaller ones. For testing the clearance, the cutter is placed on the stud with the proper bushing and the gauge pushed forward, after which the cutter is revolved sufficiently to bring the face of a tooth in contact with the stop on the gauge. This gives the correct position for the cutter and the angle of clearance on the tooth should correspond with that on the gauge.

A Combination Heating Furnace and Hot Swaging Machine.—For manufacturing by the hot swaging process, many pieces which are now either turned by screw machines or forged and ground, the Langelier Mfg. Company, Providence, R. I., has designed and built a swaging machine with a special holder and furnace. The advantages claimed for this arrangement are a large saving in stock, since there is no cutting away of the metal, which is economical in the making of high speed steel drills and end mills, and the swaging of the blanks so closely to size that only a slight amount of metal has to be ground off to finish the piece completely. The swaging head is centered around its circumference and also in back to give a cooling chamber. Cold water, supplied either by a small pump or the regular city water mains, continually flows through the chamber while the machine is running to keep it from heating up. This arrangement enables the machine to be kept in continuous operation on hot stock, thus avoiding any shutdowns to cool it off. A continuous rotary gas heating furnace has been designed for bringing the blanks to the proper temperature for the swaging operation, the temperature being closely regulated by controlling the air and the gas supplies through valves. Several changes of heating and feeding speeds are available through crown gears. Two types of furnace are built, one for heating carbon steel and the other for high speed steel work.

Bolt Pointing Device.—A head for rounding and pointing bolts or rods, which can be applied to a bolt cutting machine or an engine lathe, has been recently placed on the market by the Victor Tool Company, Waynesboro, Pa. Two high speed forming cutters $4\frac{1}{2}$ in. long and ground on the end, which can be used up to a length of 1 in., are provided for the head. It is possible to use one set of cutters for pointing and rounding many different sizes of bolts, since the arrangement of the head is such that both cutters can be adjusted simultaneously. As the cutters wear away they can be reground without changing the form of the tool. Hardened steel bushings for guiding and supporting the bolt or rod to be pointed are also provided for the head.

